Prof. A. Jacobi, M.D.
New York
Compliments & regards of
the Author.
Charleston S.C. Jan. 1893

RESOURCES

OF THE

SOUTHERN

FIELDS AND FORESTS,

MEDICAL, ECONOMICAL AND AGRICULTURAL;

BEING ALSO A

MEDICAL BOTANY OF THE SOUTHERN STATES;

WITH

PRACTICAL INFORMATION ON THE USEFUL PROPERTIES OF THE TREES, PLANTS, AND SHRUBS.

BY FRANCIS PEYRE PORCHER, M. D.,

FORMERLY SURGEON IN CHARGE OF CITY HOSPITALS, CHARLESTON; AND LECTURER ON MATERIA MEDICA AND THERAPEUTICS; CORRESPONDING MEMBER OF THE MEDICAL AND SURGICAL, AND THE OBSTETRIC SOCIETIES, AND THE LYCEUM OF NATURAL HISTORY OF NEW YORK, AND OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

Ille terrarum mihi praeter omnes
Angulus ridet, ubi non Hymetto
Mella decedunt, viridique certat
Bacca Venafro.
Ver ubi longum tepidasque præbet
Jupiter brumas.

HORACE, Carm. vi, Lib. ii.

New Edition—Revised and Largely Augmented.

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THIS VOLUME IS INSCRIBED

TO THE MEMORY OF

Virginia Leigh Porcher,

WHO AIDED IN ITS PREPARATION, AND WHO IS ASSOCIATED WITH WHATEVER OF TOIL OR OF PLEASURE, WAS ATTENDANT UPON ITS EXECUTION.

PRELIMINARY.

MEDICINAL AND USEFUL PLANTS AND TREES OF THE SOUTHERN STATES—INDIGENOUS AND INTRODUCED.

The first Edition of this volume was prepared during the late war by direction of the Surgeon-General of the Confederate States, that the Medical Officers, as well as the public, might be supplied with information, which, at the time, was greatly needed. I was relèased, temporarily, for this purpose, from service in the Field and Hospital. My connection with the last mentioned Institutions, as Physician and Surgeon, has extended almost uninterruptedly over a period of twelve years; so that my opportunities for experimental investigations in Therapeutics and practical medicine, has been ample.

This Edition has been largely added to, and much time and care have been expended in its preparation.

It is intended as a Hand-book of scientific and popular knowledge, as regards the medicinal, economical and useful properties of the Trees, Plants and Shrubs found within the limits of the Southern States, whether employed in the arts, for manufacturing purposes, or in domestic economy, to supply a present as well as a future want. Treating specially of our medicinal plants, and of the best substitutes for foreign articles of vegetable origin, my aim has been to spare no exertions, compatible with the limits assigned me, to make it applicable as well to the requirements of the Surgeon as of the Planter and Farmer; and I trust that there will still be no diminution in the desire of every one to possess a source from whence his curiosity may be satisfied on matters pertaining to our useful plants. The Physician in his private practice, the Planter on his estate, or, should the necessity arise, the Regimental Surgeon in the field, may himself collect and apply these substances within his reach, which are frequently quite as valuable as others obtained from abroad, and either impossible to be procured or scarce and costly. In preparing it, I have also had in view the wants of Emigrants and those abroad who wish to be acquainted with respect to the Agricultural capacities of this extended section of country. But information scattered through a variety of sources must needs be first collected, to be available in any practical point of view.

I have, therefore, inserted whatever I thought would throw light upon the vegetable productions of the Southern States, to enable every one to use the abundant material within his reach. An excuse will be found for any awkward arrangement of the details, in the difficulty of collating, digesting and reconciling a multiplicity of statements, some of them contradictory, from a variety of authors. I have searched through the various Catalogues

and systematic works on Botany, and noticed in almost every instance the habitat and precise locality of plants, that each one may be apprised of the proximity of valuable species. Frequent references to one limited section in particular, may be accounted for by the fact that it has been illustrated by the labors of at least three Botanists of distinction, Walter, MacBride and Ravenel. Whenever citizens of other States have performed a similar work, I have gladly availed myself of it.

Catalogues of the trees and plants growing in special localities thus become of great service, as they indicate *precisely* where valuable species may be procured. Those interested may obtain the localities of many plants found in the Southern States by consulting Elliott's Botany, Darby's, and the recent work by Chapman, of Florida, "The Flora of the Southern United States." Among the Catalogues issued at the South, is one by Dr. Jno. Bachman of "Plants growing in the vicinity of Charleston," published in the Southern Agriculturist; one by Prof. Lewis R. Gibbes of those found in Richland District, S. C.; "Plants found in the vicinity of Newbern, N. C.," by H. B. Croom; an unfinished paper by W. Wragg Smith, Esq., published in the Transactions of the Elliott Society of Charleston; "A Catalogue of Indigenous and Naturalized Plants of North Carolina, by Rev. M. A. Curtis, D. D., 1867;" and "A Medico-Botanical Catalogue of the Plants of St. John's Berkeley, S. C.," by the writer. Also my "Sketch of the Medical Botany of South Carolina," published in the Transactions of the Am. Med. Association, vol. ii, 1849. The extensive collection in the Charleston Museum, by my friend, Mr. H. W. Ravenel, and his several publications, might also be consulted with profit. I have availed myself of Dr. Chapman's work in ascertaining the names of plants added by botanists since the time of Walter and Elliott, and not contained in the Catalogues referred to. By the opportune publication of this work, I have been enabled to introduce a large number of plants possessed of valuable properties, medicinal and economical, which are common to Mexico, the West India Islands and the tropical countries. The plants have been arranged after the Natural System, adopting, for the most part, the views of Lindley.

The reference to information contained in books* serves the purpose of showing those interested in any Production or Manufacture where fuller details, which are too long to insert, can be procured. It will be seen from inspecting the list of authorities, that the labor of searching through the large number of Medical and other authorities has been very great. My chief object has been utility and the desire to benefit our people, and that future inquirers, being advised of what has been already accomplished, may proceed to more experimental researches. I have not hesitated to draw largely from any quarter, appending the name of the author, whenever I thought the matter applicable to our condition and requirements. Thus, on

*I take this occasion to express my indebtedness to Col. J. B. Moore, of Statesburg, S. C., for the use of a valuable library of agricultural and chemical books, and for many facilities afforded me in the prosecution of this work.

the subject of the Grape, Wine, Sugar, Sorghum, Tannin, Opium, Cotton, Tobacco, Tea, Ramie, Esparto Grass, Flax, Mustard, Castor Oil, Oils, Turpentine, Starch, Potash, Soda, Wood for engraving and for domestic purposes, Medicinal substances, Agricultural products generally, etc., I have been profuse in my selections from a multiplicity of sources.

I have avoided more than a cursory mention of the Cryptogamic plants, Fungi, etc., as the space occupied would be too great. I would refer the reader to my paper in the Transactions of the Am. Med. Association, vol. vii, on "The Medicinal, Dietetic and Poisonous Properties of the Cryptogamic Plants of the United States," where the subject is treated *in extenso*, and a description of several hundred useful or poisonous species furnished.

The older as well as the more recent works on the Materia Medica, Therapeutics and Medical Botany—from the *Catalogus Plantarum* of Johannes Ray and the Dispensatory of Trillerus, to Pereira, Wood, Griffith and Stille—have been consulted. I have been at the pains to search through the former, in order not only to ascertain the virtues once ascribed to our Plants, and to contrast these with the results of later investigations, but also to exhibit the mutations that have occurred in the confidence reposed in many of what are at present considered our most approved Therapeutic agents. The frequency with which this takes place warns us not to discard, upon a superficial examination, those popularly considered to be of trivial importance. The European authorities have been examined, and from them has been obtained much concerning our Medicinal and Economical plants, which is either not generally known or not alluded to in our Dispensatories, and which might be of essential service to those desirous, not merely of ascertaining what is already understood, but also more thoroughly of investigating the hidden qualities of others.

The investigation necessary for ascertaining and collecting these has unfolded a vast fund of facts relative to the virtues of a large proportion, as it will be observed, of the Plants, both obscure and well known, amongst us.

I have availed myself of the 12th Edition of the U. S. Dispensatory, recently issued and carefully revised by its able surviving author. That complete and extensive work, the *Dictionnaire de Matiere Medicale et Therapeutique Generale*, by Merat and De Lens, including the Supplementary volume, has been freely translated when necessary. I have also examined the Agricultural Journals, the Patent Office Reports, the "Rural Cyclopœdia," edited by Wilson, of Edinburgh; and have thought it not inadmissible to glean from the Journals and Newspapers of the day, which occasionally afford the earliest information on the economical resources of a country. From these I have been carefully collecting.

Many topics are, therefore, appropriately introduced which would hardly have place in a strictly Medical work. Information of this kind is generally referred to under subjects with which it is closely allied. Thus, Potash, Ashes and Soap are classed under Hickory and Oak, ("Carya" and "Quercus,") Soda and Soda Soaps under "Salsola" and "Fucus," Charcoal under Pine and Willow, ("Pinus" and "Salix,") Oils under Bene, ("Sesamum,")

Starch and Arrowroot under "Maranta" and "Convolvolus," etc., as these Plants are characteristically rich in such products. The Index, however, will contain full references.

The mode of action of Medicinal plants infinitely varies; their selection, consequently, for the several purposes required by the Physician, is not, in my opinion, a matter of mere accident, the result of guesswork or of popular reputation. Each is distinguished by the composition of its principal constituents; these are generally astringent principles, narcotics, stimulating vegetable oils, cooling, refrigerant acids, bitter tonics, cathartics, etc., etc. Some, as the Cinchonaceæ and the less active anti-periodics, contain principles still more rarely met with and more obscure in their mode of operation, which have control in warding off the access of malarial attacks. But once in possession of the main active principles furnished by a plant, it is easy to see *why* it gains credit as a remedy in certain classes of disease. This power it may share in common with many others, and several properties may be combined in various degrees in each, which it is necessary to know, preliminary to a judicious application of them. Many Plants, for example, are reputed efficacious in arresting the profluviæ, diarrhœas and discharges from the mucous surfaces generally; this should excite no surprise when it is suspected or ascertained that they contain tannin simply. In some others, as in the *Uva ursi*, for example, the tannin is associated with a stimulating diuretic oil, which further adapts it to the relief of chronic renal affections. So with those which experience teaches us produce a cathartic, emetic, narcotic, sedative, irritant, or vermifuge action on the human system. It is always in virtue of the well known principles they contain, that they prove serviceable and are preferred, and chemical analysis subsequently reveals precisely what it is upon which their powers depend. The ignorant, whether credulous or incredulous, know only by *memory* the name of the plant and the disease which it is said to suit—as in the manner of charlatans and herb doctors.

Increased attention has, within the past decade, been paid to the production and manufacture of the Concentrated Preparations, Alkaloids, Resinoids, solid and fluid Extracts, etc. We are indebted for many of these to the pharmaceutical and chemical skill of Professor Proctor, Dr. Parrish, and other competent investigators, and to the researches and publications of Prof. Geo. B. Wood. (See Am. Journ. Pharm., Journ. Phillad. College of Pharm., and Am. Pharm. Assoc.) Extensive establishments at the North are engaged in their manufacture, and an immense impulsion has been given to their use among a large and growing class of physicians and practitioners, particularly at the North and West.

I may remind the reader that the knowledge of the very existence of the Alkaloids commenced with the discovery and separation of Morphia, by Serturner and Seguin, in 1817; a modification of the Generic name of the plant from which they are first derived, is usually given to them; sometimes these are indiscriminately terminated by *in* or *ia*, but in order to have uni-

formity, the highest authorities recommend that the former should always be applied to the Neutral principle, and the latter to the Alkaloids. They are dissolved by water, but sparingly, by acids, alcohol, ether and almost all in benzine and chloroform. Tannic acid precipitates them, and is considered the best antidote for their injurious effects.

Dr. Wood refers to the unscientific names used by the so-called Eclectics in giving such appellations as Hydrastin, Iridin or Irisin to Alkaloids, Oleo-resins, etc., which should be reserved for the pure active principles when they shall have been discovered and separated; and Parrish objects to "the evils growing out of this system of practice," and to "the multiplicity of these nondescript principles, which while many of them may be valuable medicines, are prepared almost exclusively by a few manufacturers, each pursuing his own process and liable to produce varying results; while under an imperfect system of nomenclature all are classed together." This is freely admitted; still, even in the impure and comparatively complex state in which these products are used by them, they are much less bulky than powders or decoctions of the plants from which they are obtained; they are easily administered, and though preparations more scientifically constructed are to be preferred and should be used, it must be allowed that by their means a certain advance has been made and an impulse given to the employment of medicinal agents of vegetable origin, and hence incidentally to Medical Botany. Dr. Parrish also in his Practical Pharmacy sustains views similar to those I have long held:

"In justice to the so-called Eclectic practitioners, it must be admitted that they have been instrumental in introducing to notice some obscure medical plants which possess valuable properties; it is to be regretted that their disposition to run into pharmaceutical empiricism should have so long limited their usefulness and damaged their reputation."

It is this tendency of the age, as exhibited even by those who are justly considered as irregular and unscientific, coupled with the efforts and capacity of our Pharmaceutical Chemists, that we are indebted for the separation and use of Leptandrin, Hydrastin, Irisin, Apocinin, Podophyllin, Caulophyllin, etc., and a number of others which are being extensively employed both in this country and in Europe; and that the plants from which they are produced have been transferred during a comparatively recent period from the Secondary Lists and from a subordinate position in the Pharmacopœia and the Dispensatory to the Primary List.

To so great an extent are Leptandrin and Podophyllin employed at the North, that they are "leading articles of production with several of the largest manufacturing Pharmaceutists in the United States."

The use of our Indigenous Medicinal Plants is indeed extending with rapid strides; and those unacquainted with or unobservant of what has already and is being done, will be astonished at the progress that twenty years more of careful investigation of them, aided by minute chemical research and the experience obtained from clinical observation, will effect.

In this latitude, however, strange to say, it is rather regarded as a reproach for the educated Physician to be at all addicted to Botanical inves-

tigations; or that he should by any unusual assiduity add to the experience and observation acquired by him in the pursuit of his profession even the outlines of a practical knowledge of either General or Medical Botany, as if it leads necessarily to a blind belief in the potency of drugs; and so he must fain suffer the penalties attached to his uncalled for and too adventurous search in these forbidden fields. Such knowledge, so limited, has not been considered essential or appropriate, as it is everywhere else, even to the teacher of *Materia Medica* and Therapeutics; yet when the Therapeutist, who is at all informed as a Botanist, hears only the *name* of a medicinal preparation of vegetable origin, or that of an Alkaloid or Resinoid, he knows and associates immediately therewith the name, relations, character and properties of the plant from which it is derived, and conversely.

In a notice by my distinguished friend, W. Gilmore Simms, Esq., of an Article in De Bow's Review, by the writer, he refers in discursive language to the " resources of the Southern fields and forests, the natural productions in brief of the South—her resources in the woods, and swamps, and fields, the earth and rocks; for purposes of need, utility, medicine, art, science and mechanics; hints to the domestic manufacturer; to the workers in wood and earth; and rock and tree; and shrub and flower; hints, clues, suggestions which may be turned to the most useful purposes; not merely as *expedients* during the pressure of war and blockade, but continuously, through all time, as affording profit, use, interest and employment to our people."

From an inspection of the large amount of material embraced in this volume, it will be seen that our Southern Flora is extraordinarily rich.

It is the teeming product of every variety of soil and climate, from Maryland to Florida, from Tennessee to Texas. The Atlantic slopes with their marine growth, the Mountain ridges of the interior, the almost infra-tropical productions of Louisiana and South Florida, with the rich alluvia of the River courses—all contribute to swell the lists and produce a wonderful exuberance of vegetation. The Southern States occupy almost the whole of the Temperate Zone in the Western Hemisphere. Under a genial sun, and enduring neither extremes of heat or cold, they are rich in natural resources, and possess a variety of soil and a range of temperature affected by the presence of both sea and mountain.

Their geological features are diversified and somewhat peculiar. The land in the Atlantic States at varying distances from the coast rises evenly and insensibly to the height of about two hundred and fifty feet above the general tide level, forming a vast plain abounding in cypress swamps and pine and oak ridges, and constituting what is known as the Alluvial formations. For the most part, quartzose sands and clays cover the surface from the depth of from ten to twenty-five feet or more. These overlay vast beds of Tertiary marl, the Eocene, Miocene and Post-pliocene sections of which, composing the Limestone regions, crop out and expose their rich fossils in several localities. The earth of the swamps and marshes that skirt the rivers and creeks

frequently contains a large proportion of peat. Succeeding the above are the Primary formations stretching away to the mountains in the interior. The soil of this portion, derived from the disintegration of the granite, gneiss, clay-slate, and other metamorphic rocks, as they respectively come to the surface, and are subjected to atmospheric influences, presents every variety of fertility and barrenness. The geological features of the Peninsula of Florida are exceptional. These divisions are distinguished by their characteristic vegetation,* and thus we are presented with geographical and climatic influences, which combine to produce a relation between heat and moisture peculiarly adapted to the production of a variety of species, comprising many of our most active curative agents. The State of New York, which is said to include an area equal to the whole of Great Britain, according to Prof. Lee,† out of a Flora of one thousand four hundred and fifty species, contains but one hundred and fifty known to be medicinal. Here, it will be observed, in a space at the South considerably smaller in extent, a much larger proportion exists. My Sketch of the Medical Botany of S. C. embraced a notice of four hundred and ten species, out of about three thousand five hundred, possessed of medicinal or economic value; including, however, among these, some few exotic or introduced. A single circumscribed locality in the lower section of the same State, but ten miles in diameter, furnishes one and one-third more than the whole of New York. We can readily perceive what the South at large, with an expanse of territory equalling that of Great Britain, France and Germany combined, is capable of producing.

Hence, though the South has been swept as by a whirlwind, and, like one of its native pines, scathed and blasted by the lightnings of war, its inherent powers of reproduction are almost limitless. Its seasons of spring and summer are long; the navigation of its rivers is scarcely ever interrupted, and during the whole year its people may be continuously and industriously occupied. Heretofore, they have been almost exclusively confined to the labors of the field—in the production and preparation of those seven great staple articles of consumption and of export, viz: Cotton, Rice, Sugar, To-

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* "In short, the Flora of the upper verge of the Tertiary is as distinct from that of the rest of the State as are the two geological systems which meet there from each other." Prof. Tuomey's Geolog. Rep. of S. C., p. 140. I have repeatedly observed similar relations affecting a more limited space.

Throughout the States bordering on the ocean at varying distances from the coast, the same geological divisions are found, only differing in breadth and extent, and presenting great similarity as respects soil and vegetation.

Thus I have carefully noted the Flora and face of the country prevailing in Fairfield County, S. C., and Powhattan, Va., and have observed a marked resemblance in almost every respect. A narrow strip of Long leaf Pine, for example, is found bordering the southeastern extremities of each of these counties. See Report to Elliott Soc. of Charleston.

† A Catalogue of the Medic. Plants, Indig. and Exot., growing in the State of New York. By C. A. Lee, Prof. Mat. Med., etc. New York, 1848.

bacco, Wheat, Corn and Turpentine, which though dethroned as "Kings," yet still create or move the commerce of the world and form the wealth of States. Now, however, immense Mills and Manufactories must spring up to consume the raw material of the most important of these products, which is grown at their doors, and which has heretofore been carried elsewhere to be returned to us burdened with the cost of transportation and of the labor and skill expended upon its conversion into fabrics.

It will, therefore, be observed how important it is for us to understand the Flora as well as the soil of a country; and as one at least of our staple commodities has suffered, we must seek to diversify our industries; and by a more intelligent observation we may discover new products adapted to our wants and capable of being produced here. It will be observed that most of our useful Plants are not indigenous. Many now in the woods may, by careful cultivation, become greatly improved in quality, and tenfold more productive—as has already been done with our wild grapes, apples, cauliflowers, strawberries, etc., etc.

Central Botanical Gardens should be established in place of Parks, which may be made useful to the industry of man, and are as important to a State as Geological Surveys.

I here introduce a notice of upwards of five hundred substances, possessing every variety of useful quality. Some will be rejected as useless, others may be found upon closer examination to be still more valuable. The most precious of all Textile Fibres and Grains, Silks, Seeds, Fruits, Oils, Gums, Caoutchouc, Resins, Dyes, Fecula, Albumen, Sugar, Starch, Vegetable Acids and Alkalies, Liquors, Spirit, Burning Fluid, material for making Paper and Cordage, Grasses and Forage Plants, Barks, Medicines, Wood for Tanning and the production of Chemical Agencies, for Timber, Ship-building, Engraving, Furniture, Implements and Utensils of every description—all abound in the greatest munificence, and need but the arm of the authorities or the energy and enterprise of the private citizen to be made sources of utility, profit or beauty.

Among the Resources of the South, I had intended to refer to the Phosphates recently discovered and developed, in one section, at least, which may contribute so materially to improve the production of our Fields. I had prepared a history of them, to be published as an appendix to this volume, but the want of space forbids.

There is a subject, however, which the writer has been long reflecting upon, and which he considers one of supreme importance, whether we regard the improvement of our Cultivated Crops, or the Fields and Forests of the country. If successfully carried out, it will reclaim and render fit for tillage vast bodies of lands now lying idle, and greatly improve their sanitary condition. It will also make white labor available during the whole year, and greatly stimulate immigration.

I refer to the DRAINAGE of the Marshes and Swamp lands, particularly

those near the Cities and along the River courses. This, save in particular instances, cannot now be done by the separate and isolated efforts of planters and farmers, but should be accomplished as a public work by the State. Operations could be commenced on the inland Swamps, each of which presents an independent problem to the Civil Engineer. Along our coasts, at a distance of forty miles from the sea, there is a rise of about twenty feet above the general tide level, giving a fall of half a foot to the mile, which is sufficient. In my own experience, these are capable of thorough and perfect drainage.

The Engineer Mills, in his Statistics of S. Carolina, published in 1826, has presented an elaborate scheme of this kind, by which it was proposed that the State should purchase so many slaves, and when the Swamps were drained, the lands so improved and increased in value should be sold to the Farmers and Planters.

Enterprises of a similar nature, on an extensive scale, have long since, as is generally known, been successfully prosecuted in Holland and in Belgium. The Harlaem Meer, drained in 1839, was 4,500 acres in extent, with an average depth of thirteen feet. The works were executed by the government at an expense of 15*l.* 5*s.* per acre. The whole of the bed of the lake has been brought into cultivation, and the government has been partially repaid by the sale of the land. Large tracts of alluvial land have been reclaimed, both in Holland and Belgium. The Campine, in Belgium, has been subjected to a system of both drainage and irrigation.

Large Bogs in Ireland, the Chat Moss, and the Bogs of Allen have been successfully reclaimed by surface ditches and by auger-holes descending to the pervious strata below.

Fens and Morasses in Yorkshire, and in various other counties in England, have been transformed from barrenness to fertility, and now yield abundant crops of pasturage.

In Milan, the system of irrigation is extensively practiced on Meadow land, and near Mantua, as in the time of Virgil, the superabundant water has been reduced within its proper channels, to the great advantage of the State.

The operations by the late East India Company have been brilliant in their results, the engineers availing themselves of the huge works of their Indian predecessors. Fifty per cent. has been realized.*

The French in Algiers have succeeded in draining and reducing to successful cultivation the entire plain of the Alemtijo, which was before an unhealthy region, and which now produces abundantly all the tropical fruits, grains, etc., to supply the demands of the mother country.

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*See, for more practical details, The Rudiments of Hydraulic Engineering, by G. R. Burnell, F. G. S., Civil Engineer; The Art of Draining Districts and Lands, and Drainage and Sewage of Towns, by G. D. Dempsey, C. E.; and Embanking Lands from the Sea, by Jno. Wiggins, F. G. S. J. S. Virtuè, London. I insert these references on account of the truth of the maxim: "Scire ubi aliquid invenire possis, maxima pars scientiæ est." The first thing is to know where to get information.

The writer has seen the picturesque and fertile Valley of the Chiana in Italy, smiling in peace and plenty, strewn with villas and farmhouses, and intersected by the best constructed roads, always so indicative of wealth and abundance; yet this beautiful Valley, which now supplies all Tuscany with corn, wine and oil, was once a pestilential and almost deserted region, and noted in the earliest times for its insalubrity, as evidenced by the striking allusion made to it by Dante in the Inferno.*

This has been accomplished by the skill of Count Fossombroni, who followed the plan recommended by Torricelli in draining the Maremma by hydraulic engineering. It is known as the system of *Colmates*, and consists in turning the course of rivers or streams coming from clay-hills, so that they deposit the sand and mud with which they are charged, and thus raises the general level and at the same time causing a fall of the stagnant water, converts it into a rich and fertile tract. (Opere Pratiche sopra il Val di Chiana, published at Montepulciano; a copy of which is in the possession of the writer.)

The simplest plans for draining the secondary or inland Swamps, is to run a straight central canal, which removes the obstructions caused by logs and mud flats, and takes off the main body of water. A canal or drain is also cut on each side to receive the water coming in from the surrounding high lands. The underground system with Tiles, generally practiced in England and on the Continent, is only applicable in this country to a limited extent at present.

The lands throughout a large portion of the South are quite rich enough for every purpose, and we need not go to the West or elsewhere in quest of better soil. Since emancipation, immigrants from Europe may be employed in these public works now proposed. The cutting down the trees and exposing the surface to the almost constant action of the sun, will subject it to the important agency of evaporation; the removal of the causes of malaria will be the result; and if complete exemption of the sickly portions of the States from its baneful influences and from periodical fevers, by which white labor is made possible, is not secured, the hygienic condition of the whole country will, at least, be improved, and the wealth and happiness of our citizens generally enormously increased.

By draining our Swamps, we secure a soil for corn, cane, etc., enriched by the vegetable matter accumulated for centuries, and the higher lands are released for cotton and other crops.

Besides, when we drain the Swamps there ensues an interstitial drainage, by a process of molecular absorption incessantly acting, which extends for miles around, affecting the high lands at a much greater distance than many

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*Qual dolor fora se degli spedali
  Di Valdichiana, tra'l luglio e'l settembre,
E di Maremma e di Sardigna i mali
  Fossero in una fossa tutti insembre.

CANTO xxix, and the PARADISO, c. xiii.

would suppose, rendering them drier, and allowing pines, oaks and other plants to spring up where before only swamp trees and rank grasses grew.

Islands and isolated sections of country favorably situated, as, for example, those adjoining Charleston, and embraced between the Cooper and Ashley, the same being true of those lying near other cities, and along our coast, can be drained and made rich and habitable even in the warm months. They will be occupied by Garden Farms which will supply, not only the cities contiguous to them, but fill our ships going to the North with fruits, vegetables and produce.

Many of us residing on the Coast are aware of what was accomplished in the way of Embankments by our fathers and the earlier settlers of the State. They were built for the most part to aid in the cultivation of rice, but the remains of these immense banks attest the industry and enterprise of our people and are an earnest of what we ourselves may accomplish when fostered and aided by the State.

It is true that much of this work was done under the system of primogeniture, when it was in the power and to the interest of the owner of the soil to make lasting improvements, and by so doing look for the permanent welfare of his descendants. A different organization of labor and capital also enabled the private individual to accomplish more then than now. These considerations, however, furnish arguments in support of the same being done by the State; which should, when it becomes necessary, perform for its citizens those acts of public utility, the right or the ability to do which depended upon systems and institutions which it has, from reasons of policy or interest, abolished or destroyed, and being deprived of which, they suffer.

To carry out the project imperfectly unfolded above, the State or Government may organize a Drainage Commission or Joint Stock Association, which will make the financial scheme a feasible and successful one, into the details of which I cannot now enter. Its realization is doubtless impossible at present; but viewed in every light as respects the common welfare, it involves enterprises which are to us and to those coming after us of commanding importance and worthy of the most thoughtful consideration.

When the time arrives for its execution, the wisdom and policy of the step being apparent, it will establish the distinction of any Administration which undertakes it, or the fame of any Statesman who shall have the wit to use his influence successfully to achieve it. *Finis coronat opus.*

WORKS CONSULTED AND ABBREVIATIONS USED.

WORKS.	ABBREVIATIONS.
Catalogus Plantarum Angliæ, cum Observationibus et Experimentis Novis Medicis et Physicis. Londini, 1667. Auct. Johannes Ray.	Cat. Plantarum.
English Physician. By Nicholas Culpepper, gent., "Student in Physic and Astrology." "An Astrologo-Physiological Discourse on Vulgar Herbs," etc.	Culp. Eng. Phys.
Bulliard, Histoire des Plantes Veneneuses de la France, 4 vols. Paris, 1774.	Bull Plantes Ven. de France.
Hortus Americanus. By Dr. Barham.	Bar. Hort. Amer.
Linnæus, Vegetable Mat. Medica. Translated by C. Whitlaw.	Linn. Veg. M. Med.
Demonstrations Elementaire de Botanique. Containing dem., veg., phys. properties, and uses of plants. With much information concerning the vegetable veterinary practice, etc. By J. Gillibert. Lyons, 1787.	Dem. Elem. de Bot.
Plantæ Rariores Hibernia Inventæ, etc. With Remarks on the Properties and Uses. By Walter Wade, M. D., M. L. S. Dublin, 1804.	Wade's Pl. Rariores.
Le Medecin Herboriste. Paris, 1802.	Le Med. Herb.
New Med. Discoveries, 2 vols. London, 1829. By C. Whitlaw.	Whitlaw's New Med. Disc.
Am. Herbal, or Materia Medica. With New Medical Discoveries. By Samuel Stearns, LL. D. Walpole, 1801.	Stearn's Am. Herbal.
Flora Scotica. By John Lightfoot. Edinburg.	Fl. Scotica.
Indigenous Botany. By Colin Milne, LL. D., and Alexander Gordon. London, 1793.	Milne Ind. Bot.
A New Family Herbal; or, an Account of Plants and their Properties in Medicine and the Arts. By R. J. Thornton. London, 1810.	Thornton's Fam. Herb.
Lindley's Natural System of Botany. With the Uses of Important Species in Medicine, the Arts, and Domestic Economy. London, 1836.	Lind. Nat. Syst. Bot.
Medical Botany. By W. Woodville, 4 vols. London, 1790. Sec. edition, 1800.	Woodv. Med. Bot.
Barton's Med. Botany.	Bart. M. Bot.
W. P. Barton's Flora. Philadelphia, 1823.	Bart. Flora.
Rafinesque's Medical Flora.	Raf. Med. Fl.
Bigelow's Am. Medical Botany, 4 vols. Boston, 1820.	Big. Am. Med. Bot.
Barton's Collection towards the Formation of a Materia Medica.	Barton's Collec.
Medical Botany. With the uses of Important Species in Medicine, the Arts, etc. By R. E. Griffith. Philadelphia, 1847.	Griffith's Med. Bot.
Illustrations of Medical Botany. By Joseph Carson, M. D. With Descriptions, etc. Philadelphia, 1847.	Carson's Illust. Med. Bot.

Sheeut's Flora Carolinæensis; or, a History, Medical and Economical, of the Vegetable Kingdom. Charleston, 1806.	Sheo. Flora Carol.
Elliott's Sketch of the Botany of South Carolina and Georgia. With Medical Notes. Charleston, 1806.	Ell. Bot. Med. Notes.
Drayton's View of South Carolina. Charleston, 1802.	Drayton's View.
Chalmer's History of South Carolina.	Chalmer's Hist. S. C.
Garden's and Lining's Observations, Physical and Literary.	Gard. and Lin. Obs.
Travels in South and North Carolina. By John Lawson, Surveyor-General, 1716.	Lawson's S. C.
United States Dispensatory. By Wood and Bache. Philadelphia, 1846. 12th Edition, 1868.	U. S. Disp.
Thacher's United States Dispensatory.	Thacher's U. S. Disp.
American Dispensatory. By R. Coxe.	Coxe, Am. Disp.
Bergii Materia Medica. E. regno vegetabili, etc. Stockholmiæ, 1782.	Bergii, Mat. Med.
Cullen's Materia Medica. Edinburgh.	Cullen, Mat. Med.
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Pereira's Materia Medica and Therapeutics, 2 volumes.	Pe. Mat. Med. and Therap.
Practical Dictionary of Materia Medica. By John Bell. Philadelphia.	Bell's Pract. Dict.
Eberle's Materia Medica and Therapeutics, 2 vols. Philadelphia, 1834.	Eberle, Mat. Med.
Edwards and Vavasseur's Matiere Medicale. Paris, 1836.	Ed. and Vav. Mat. Med.
Trousseau et Pidoux, Traite de Therapeutique, et de Matiere Medicale. Paris, 1837.	Trous. et Pid. Mat. Med.
Elements of Materia Medica and Therapeutics. By H. R. Frost, Prof. M. M. Medical College of South Carolina.	Frost's Elms. Mat. Med.
Chapman's Therapeutics and Materia Medica, 2 vols. Philadelphia, 1822.	Chap. Therap. and Mat. Med.
Ballod and Garrod's Materia Medica. London, 1846.	Ball. & Gar. Mat. Med.
Royle's Materia Medica and Therapeutics. Philadelphia, 1847.	Royle, Mat. Med.
Merat and de Lens' Dictionnaire Univ. de Matiere Medicale. Paris, 1837, tom. vi.	Mer. and de L. Dict. de M. Med.
Supplementary volume to the above. Paris, 1846.	Supplem. to Dict. Univ. de M. Med.
Watson's Practice of Physic. Second American Edition. Philadelphia, 1845.	Watson's Practice Physic.
Stille's Therapeutics and Materia Medica. Philadelphia, 1862–'6.	
Statistics of South Carolina. A View of its Natural, Civil and Military History. By Robert Mills, Civil Engineer. Charleston, 1826.	
Southern Agriculturist. Charleston, 1820–'39.	So. Agricult.
Matson's Vegetable Practice. 1839.	Matson's Veg. Pract.
Imp. System Botanical Medicine. By Horton Howard.	Imp. Syst. Bot. Med.

Pharmacopœias, Journals, Reviews, Monographs, Inaugural Theses, etc., both American and foreign.

The Principles of Agriculture, by Albert D. Thaer, translated by William Shaw, Esq., member of the council of the Royal Agricultural Society of England, etc., and C. W. Johnson, Esq., F. R. S. 4th Edition. New York: Bangs, Brother & Co., 1852.

Flora of the Southern United States, containing an abridged description of the flowering plants and ferns of Tennessee, North Carolina, South Carolina, Georgia,

Alabama, Mississippi, and Florida, arranged according to the natural system, by A. W. Chapman, M. D. The ferns by Daniel C. Eaton. New York, 1860.

Rural Economy, in its relations with chemistry, physics, and meteorology, or chemistry applied to agriculture, by J. B. Boussingault, member of Institute of France, etc. Translated by George Law, Agriculturalist. New York, C. M. Saxton, 1857.

Saxton's Rural Hand Books. New York, 1852.

Thornton's Southern Gardener, and Receipt Book. Camden, S. C.

Enquire Within; 3,700 facts. New York, 1857.

The Fruit Gardener. Philadelphia, 1847.

Downing's Fruit and Fruit Trees of America. New York, 1858.

The Southern Farmer and Market Gardener, by Prof. F. S. Holmes, Charleston, S. C.

The Art of Manufacturing Soaps and Candles. By P. Kurten. Philadelphia, Linsay & Blakiston, 1854.

Industrial Resources of the South and West, by J. D. B. DeBow. New Orleans, 1853.

Sorgho and Imphee, the Chinese and African Sugar Canes, by H. S. Olcott. New York, 1857.

Ure's Dictionary of Arts, Manufactures, and Mines. From the 4th English edition. New York, 1853.

Chemistry applied to Agriculture, by Count John Antony Chaptal. Boston, 1835.

Chemical Field Lectures, by J. A. Stockhardt. Translated from the German. Cambridge, 1853.

Parrish, Practical Pharmacy. Philadelphia, 1859. This work contains information respecting the active principles of plants, oils, acids, etc., with many pharmaceutical details.

Positive Medical Agents, a Treatise on the new alkaloid, resinoid and concentrated preparations of native and foreign Medical Plants; by authority of the American Chemical Institute. New York, 1854.

The Art of Tanning and Leather Dressing. By Prof. H. Dussouce. Philadelphia and London, 1867.

A Muck Manual, by Samuel L. Dana. New York, 1858.

The Fruit Garden. A Treatise by P. Barry. New York, 1857.

Practical Treatise on Culture of Grape, by J. Fiske Allen. New York, 1858.

Charlton on Culture of Exotic Grape under Glass. New York, 1853.

Elements of Scientific Agriculture, by S. P. Norton, Professor in Yale College, New York, 1854.

A Manual of Scientific and Practical Agriculture, for the School and the Farm, by J. L. Campbell, A. M., Professor Physical Science, Washington College, Va. Philadelphia, 1859.

The American Grape Grower's Guide, intended especially for the climate of America. Illustrated by William Charlton. New York, A. O. Moore, 1859. For full description of best modes of cultivating the grape.

Sorgho and Imphee, the Chinese and African Sugar Canes. Manufacture of sugar, syrup, alchohol, wines, beer, cider, vinegar, starch, and dye stuffs, with translations of French Pamphlets, etc., etc., and drawing of machinery, by H. S. Olcott. New York, A. O. Moore, 1857.

Patent Office Reports, Agriculture, 1848, '51, '53, '54, '55, '56, '57, '58.

Rural Chemistry, by Edward Solly, F. L. S., Honorary Member of Royal Agricultural Society, England. Philadelphia, Henry C. Baird, 1852.

The Rural Cyclopædia, or a General Dictionary of Agriculture, and of the Arts, Sciences, Instruments, and Practice necessary to the Farmer, etc. Edited by Rev. Jno. M. Wilson. In four volumes. Edinburgh, 1852, A. Fullarton.

General Directions for Collecting and Drying Medicinal Substances, with a list of Indigenous Plants. From the Surgeon-General's office, 1862. Richmond. A pamphlet.

Tobacco Culture. Practical details from the selection and preparation of the Seed and Soil to harvesting, curing, and marketing the crop. Plain Directions, as given by fourteen experienced cultivators. New York, 1867-8.

Essays on Cultivation of Flax Seed and Castor Beans. Published by the St. Louis Seed and Oil Co., 1868.

A Catalogue of Indigenous and Naturalized Plants of the State of North Carolina, by Rev. M. A. Curtis, D. D. Raleigh, 1867. This contains over a hundred *edible* Mushrooms, designated by italics. Mr. Curtis will soon publish Illustrations of these Fungi.

I have not enumerated the numerous authorities I had examined with reference to the Medicinal and Economical properties of the Cryptogamic Plants, Fungi, and others of this class.

The following works, published in England, may be referred to in case any are desirous of consulting them:

Miller's Gardener's Dictionary, Marshall on Planting, Nichols' Planter's Calendar, Ponty's Profitable Planter, Phillips' Shrubbery, Treatise on Planting in the Library of Useful Knowledge, Loudon's Encyclopædia of Plants, Accum on the Adulterations of Food, Babbage on the Economy of Machinery and Manufactures, Thompson's Vegetable Chemistry, Knapp's Technology, Willich's Domestic Encyclopædia. See, also, Treatise by Dr. J. Harris, of Mass., on Insects injurious to Vegetation, and Townsend Glover's papers on same subject in Patent Office Reports.

☞ Those interested in obtaining foreign seeds, plants, etc., can obtain them by applying to James Carter & Co., and Butler and McCulloch, of London; William Thompson, of Iswich, England; and Vilmorin, Andreux & Cie., Paris, France.

Dr. Parrish in his "Practical Pharmacy," says that the *cultivation* of medicinal plants in this country, for sale, as such, is mainly confined to the beautiful valley in Columbia, Co., N. Y., where it is pursued by the Shakers and by *Tilden & Co.* "This district seems specially adapted to the purpose, and like the celebrated Physic gardens of Mitcham, England, furnishes a great variety and in large quantity." "For an interesting account," he adds, "of the Physic gardens of Mitcham, see Am. J. Pharm. v. XXIII., p. 25; for some details in regard to the N. Lebanon gardens, where every kind of medicinal preparation from native and medicinal plants, are prepared on an extensive scale, see the same Journal, v. XXIII., p. 386."

The gathering of the Sumac leaves so extensively and profitably pursued in Va. (1868), and to which I had invited attention as an original suggestion in the first Edition of this Book (see Sumac), is well worthy of imitation as an industrial pursuit by a large number of people residing in other States, and I therefore give prominence to it by the above reference.

INTRODUCTION.

GENERAL DIRECTIONS

FOR

COLLECTING AND DRYING MEDICINAL SUBSTANCES OF THE VEGETABLE KINGDOM.

DIRECTIONS FOR COLLECTING.

All leaves, flowers, and herbs should be preferably gathered in clear, dry weather, in the morning, after the dew is exhaled.

The roots of medicinal plants, although more advantageously gathered at certain periods, to be hereafter specified, do not lose their medicinal virtues in consequence of being dug in midsummer. It is probable that most of those imported are thus collected by savages or ignorant persons, when the plant is in full leaf, it being then more easily recognized.

Plants, Annual, should be gathered at the time when their vegetation is most vigorous, which is generally from the time they begin to flower until their leaves begin to change.

Plants, Biennial, should, in most instances, be gathered in the second season of their growth, and about the time of flowering.

Roots of Annuals are to be gathered just before the time of flowering.

Roots of Biennials are to be gathered after the vegetation of the first year has ceased.

Roots of Perennials are to be gathered in the spring, before vegetation has commenced. Roots should be washed, and the smaller fibres, unless they are the part employed, should be then separated from the body of the root, which, when of any considerable size, is to be cut in slices previous to being dried.

Bulbs are to be gathered after the new bulb is perfected, and before it has begun to vegetate, which is at the time the leaves

decay. Those which are to be preserved fresh should be buried in dry sand.

BARKS, whether of the root, trunk, or branches, should be gathered in the autumn, or early in the spring. The dead epidermis or outer bark, and the decayed parts, should be removed. Of some trees (as the elm) the inner bark only is preserved.

LEAVES are to be gathered after their full development, before the fading of the flowers. The leaves of biennials do not attain their perfect qualities until the second year.

FLOWERS should, in general, be gathered at the time of their expansion, before or immediately after they have fully opened; some—as the Rosa Gallica—while in bud.

AROMATIC HERBS are to be gathered when in flower.

STALKS AND TWIGS should be collected in autumn.

SEEDS should be collected at the period of their full maturity.

DIRECTIONS FOR DRYING.

Medicinal products of the vegetable kingdom (as plants, roots, etc.) should be dried as rapidly as is consistent with their perfect preservation, but not subjected to extreme heat.

Those collected in the warm months and during dry weather may, except in a few instances, be dried by their spontaneous evaporation, in a well ventilated apartment; some—as roots and barks—may be exposed to the direct rays of the sun.

In spring and autumn, and in damp, foggy, or rainy weather, a drying-house should be resorted to; the temperature to range from 70° to 100° F. There should be an aperture above for the escape of warm, moist air.

FIBROUS ROOTS may be dried in the sun, or at a heat of from 65° to 80° F. in the drying-room.

FLESHY ROOTS should be cut in transverse slices, not exceeding half an inch in length, and during the drying process should be stirred several times to prevent their moulding.

BULBS must have the coarse outer membrane peeled off. In other respects they are to be treated like fleshy roots.

Barks, Woods and Twigs readily dry, in thin layers, in the open air.

Leaves, after separation from the stalks, should be strewed losely over hurdle-frames, and their position changed twice a day, until they become dry. When very succulent, they require more care to prevent their discoloration. For thin, dry leaves, the heat need not exceed 70° F.; for the succulent, it may gradually be raised to 100° F.

Annual Plants and Tops.—If not too juicy, these may be tied loosely in small bundles, and strung on lines stretched across the drying-room.

Flowers must be dried carefully and rapidly, so as to preserve their color. They should be spread loosely on the hurdles, and turned several times by stirring. When flowers or leaves owe their virtues to volatile oils, greater care is necessary.

A carefully pressed specimen of the stem, leaf, and flower of each medicinal substance collected, whether it be bark, root, or herb, should be obtained and forwarded with each collection, for the purpose of aiding in its identification. The above is from "General Directions" and List of Plants—a pamphlet issued from Surgeon-General's Office, 1862. Consult, also, U. S. Dispensatory.

The two following papers, contributed by the writer to a Periodical during the war, are introduced before entering upon the systematic portion of the Work, because they contain information, in a condensed shape, which may be practically useful:

BRIEF NOTICE OF EASILY PROCURABLE MEDICINAL PLANTS, TO BE COLLECTED BY SOLDIERS WHILE IN SERVICE IN ANY PART OF THE SOUTHERN STATES.

My attention having been occupied with the subject of the substitutes for imported Medicines, I have thought that if some hints were given the Surgeons and Assistant Surgeons in the field, with respect to the useful properties of a few articles (easily attainable in every part of the country), it would

greatly lessen the use of the more expensive medicines. One man detailed from each company, or from a regiment, could obtain a full supply of each substance fresh, for the use of the Surgeon, and this at less trouble and expense than if it was procured by the Medical Purveyors, to be distributed to the regiments. I will mention some of these substances. They are familiar to all, but still without special recommendation, they are likely to escape attention:

Sassafras (*Laurus*).—Whilst engaged in active duties as Surgeon to the Holcombe Legion, whenever a soldier suffered from measles, pneumonia, bronchitis, or cold, his companion or nurse was directed to procure the roots and leaves of Sassafras, and a tea made with this supplied that of Flax Seed or Gum Arabic. The leaf of the Sassafras contains a great amount of mucilage.

Bené (*Sesamum*).—The leaves of the Bené may be used in camp dysentery, in colds, coughs, etc., in place of Gum Arabic or Flax Seed. One or two leaves in a tumbler of water imparts their mucilaginous properties.

Dogwood (*Cornus Florida*).—During the late war, the bark has been employed with great advantage in place of quinine in fevers—particularly in cases of low forms of fever, and in dysentery, on the river courses, of a typhoid character. It is given as a substitute for Peruvian barks. In fact, in almost any case where the Cinchona bark was used.

Thoroughwort, *Bone-set* (*Eupatorium perfoliatum*).—Thoroughwort, drank hot during the cold stage of fever, and cold as a tonic and antiperiodic, is thought by many physicians to be even superior to the Dogwood, Willow, or Poplar, as a substitute for quinine. It is quite sufficient in the management of many of the malarial fevers that will prevail among troops during the warm months; and if it does not supply entirely the place of quinine, will certainly lessen the need for its use. These plants can be easily procured in every locality.

Tulip Bearing Poplar (*Liriodendron*) and the *Willow* bark supply remedies for the fevers met with in camp. The Cold infusion is given.

Sweet Gum (*Liquidambar Styraciflua*).—The inner bark contains an astringent, *gummy* substance. If it is boiled in milk,

or a tea made with water, its astringency is so great that it will easily check diarrhœa, and associated with the use of other remedies, dysentery also. The leaf of the gum, when green, I have also ascertained to be powerfully astringent, and to contain as large a proportion of tannin as that of any other tree. I believe that the Gum leaf and the leaf of the Myrtle and Blackberry can be used wherever an astringent is required; cold water takes it up. They can, I think, be also used for tanning leather, when green, in place of oak bark.

Blackberry Root (*Rubus*).—A decoction will check profuse diarrhœas of any kind. The root of the Chinquapin (*Castanea*) is also astringent.

Gentian.—Our native tonics are abundant. Several varieties of *Gentian*, *Sabbatia*, etc., may be added to those mentioned. The *Pipissewa*, or Winter Green (*Chimaphila*), is both an aromatic tonic and a diuretic, and therefore selected in the convalescence from low fevers followed by dropsical symptoms. These, the numerous aromatic plants, etc., are not intended to take the place of other medicines, which can be obtained and are required. It is not intended that a blind or exclusive reliance should be placed in them—but they were recommended to supply a great and pressing need.

Holly (*Ilex Opaca*).—The bark of the holly root chewed, or a tea made with it, yields an excellent bitter demulcent, very useful in coughs, colds, etc. The bitter principle is also tonic. The Holly contains bird-lime.

Wild Jalap (*Podophyllum Peltatum.*—If this can be found it can be used as a laxative in place of rhubarb or jalap, or wherever a purgative is required. Every planter in the Southern States can produce the opium, mustard, and flax seed that is needed for home use.

Swamp Dragon, (*Saururus Cernuus*).—The roots of this plant, growing abundantly in the swamps and marshes along the seaboard, boiled and mashed, furnish an easily procurable and highly soothing material for poultices—admirably adapted to the wants of large bodies of men in camps, as well as of negroes on our plantations.

Potash, pearlash, and soda are easily procurable from the ashes of certain plants. Our *Salsola Kali*, growing on the sea

coast, is rich in soda. Consult Index for references to more detailed information.

SOUTHERN TREES ADAPTED TO THE PURPOSES OF THE MANUFACTURER AND WOOD ENGRAVER.

In answer to an inquiry of a correspondent, I gave the names of several Trees growing at the South as probably suited for the purposes of the wood engraver. To these I will now add those noticed by subsequent correspondents, and also call attention to two or three other Trees with wood of great fineness and density of structure, which may be tested as substitutes for the wood heretofore imported from the North; and which are also likely to prove serviceable whenever a wood of hard, fine grain is required by the manufacturer.

Iron Wood, Horn Beam (*Ostrya Virginica, Ell. Sk.*)—It has often been employed by turners, and wrought into mill-cogs, wheels, etc. The wood is tough and white, and will prove an important acquisition to those interested in machinery, or in the construction of implements, tools, etc.

White Beech, (*Fagus sylvatica*).—Diffused. This wood is very hard, is capable of receiving a high polish, and should be prized by cabinet makers and turners for manufacturing purposes.

Sweet Birch, Cherry Birch, Mountain Mahogany (*Betula lenta, Linn.*)—Grows in the mountains of South Carolina and Georgia, possesses a fine grain, and also susceptible of a beautiful polish. The Red Birch (*Betula nigra*) grows in our swamps in the lower country. The Black Birch is said by Lindley to be exceedingly hard.

White Oak (*Quercus alba*).—One of the best of the Oaks, with the Live Oak, likely to be employed wherever great durability is desirable; these, with the Walnut and Maple, are well known.

Dog Wood (*Cornus Florida*).—Much used on our plantations wherever a wood of firmness of texture is required.

Persimmon (*Diospyros Virginiana*).—A very hard wood—in the natural family of plants found under what is known as the *Ebony* tribe.

The *Holly* (*Ilex opaca*), the Apple and Pear are very much esteemed by many; perhaps harder than any of those cited. These may be more particularly adapted to the purposes of the wood engraver.

The *Calico Bush, Ivy Bush,* (*Kalmia latifolia*).—Grows in our middle districts. Wood hard and dense.

Mountain Laurel, Bay (*Rhododendron maximum*)—Found in our mountains; said to resemble the Kalmia, and quoted by a writer as adapted to the purposes of the engraver.

Iron Wood.—Another tree named from its supposed firmness (*Bumelia Lycioides Ell. Sk.*) I have collected it in Charleston, and forty miles from the ocean.

Yellow Locust Tree, False Acacia (*Robinia pseudoaccaciæ, L.*)—In mountains and in lower districts. The grain is fine and compact; the wood, on account of its durability, is much used for treenails in ship building.

Leather Wood (*Dirca palustris*).—Grows in Georgia; is both hard and pliable.

Arbor Vitæ (*Thuja occidentalis*).—Grows in the mountains. The wood said by Michaux to be the most durable which our forests produce.

The *soft* woods are: the Cedar, the Cypress, the Black Spruce, or Fir (*Pinus nigra*, Aiton), the *Pinus strobus* (growing in the mountains), and the Spruce tree of our low country swamps, which might well supply the place of Northern pine. All these, with the Willow (*Salix nigra*), are used for the timbers and spars of boats. The last is both soft and durable. Mr. Elliott says, in his Sketch of the Botany of South Carolina, that the wood of the Red Mulberry (*Morus rubra*) is preferred in the building of boats to that of any other, except the Red Cedar.

The wood of the Black Gum (*Nyssa aquatica*), particularly the portion near the ground, is peculiarly white, spongy, and light. It has great elasticity, and a specific gravity almost low enough to adapt it, in the opinion of the writer, to be used as a substitute for the bark of the Cork tree. The Sycamore is a very light wood, and the Catalpa also.

The Poplar is well known for its qualities of softness and lightness. The Maple less so. The Pride of India is light and durable, and susceptible of polish with a pretty grain under varnish, adapting it to the purposes of the manufacturer. But these do not resist water when submerged, as do the softer woods first mentioned, viz: the Cypress, Cedar, or the Palmetto, which is characteristically soft, porous, and elastic.

RESOURCES

OF THE

Southern Fields and Forests,

MEDICAL, ECONOMICAL, AND AGRICULTURAL.

Class I. EXOGENS; OR, DICOTYLEDONOUS

FLOWERING PLANTS.

Sub-Class I. POLYPETALÆ.

NATURAL ORDERS.

Ranunculaceæ. (*Crow-Foot Tribe.*)

The plants belonging to this order are generally acrid, caustic, and poisonous. It contains some species, however, which are innocuous. The caustic principle is volatile, and neither acid nor alkaline.

CRISPED CLEMATIS; BLUE JESSAMINE, (*Clematis crispa*, Linn.) Not of Ell. Sk., which is the *C. cylindrica*, T. and Gray. Grows in damp, rich soils, and in swamps in the low country of South Carolina; vicinity of Charleston, Dr. Bachman. Newbern, Croom. N. C. Curtis. Fl. May.

Mér. and de. L. Dict. de M. Méd. ii, 311; U. S. Disp. 1244; Shec. Flora Carol. 418. This plant is substituted for the *C. erecta*, mentioned by Storck, and is employed in secondary syphilis, ulcers, porrigo, etc.; given internally, with the powdered leaves applied to the sore. It acts also as a diaphoretic and diuretic. Mérat says it possesses the properties of the *C. vitalba*, which is a dangerous vegetable caustic, used as a substitute for cantharides, and applied to rheumatic limbs, and in paralysis and gout. The decoction of the root is alterative and purgative; and is also said to be valuable in washing sores and ulcers, in order to change the mode of their vitality, and to

make them cicatrize. Shecut remarks that "the Spanish or blistering flies are very fond of the *Clematis crispa*, and it would be well for medical gentlemen in the country to propagate the plant about their residences, in order to secure a constant succession of these valuable insects." See Potato, "Convolvulus." The American species are deserving of particular attention, and I would invite further investigation of them. The taste of the flower and seed vessel of the Clematis is exceedingly pungent, and the juice irritates the skin, as I have myself experienced.

TRAVELLER'S-JOY; LEATHER FLOWER, (*Clematis viorna*, L.) Grows in middle and upper districts of South Carolina. Elliott. N. C., Curtis. Fl. July.

Shec. Flora Carol. 489; Griffith's Med. Bot. 86; U. S. Disp. 1244. This, and the following, have also a caustic property, and are employed internally as diuretics and sudorifics in chronic rheumatism; and externally, in the treatment of eruptions, and as vesicants. Shecut says that a yellow dye may be extracted from both leaves and branches; the latter are sufficiently tough to make withs and fagots. The fibrous shoots may be converted into paper, and the wood is yellow, compact, and odoriferous, furnishing an excellent material for veneering.

VIRGIN'S BOWER; TRAVELLER'S-JOY, (*Clematis Virginiana*, Linn.) Grows in rich soils; vicinity of Charleston. N. C. Fl. July. Wood and Bache, U. S. Disp. 1244; Griffith, Med. Bot. 80. See *C. viorna.*

WOOD ANEMONE, (*Anemone nemorosa*, L. *Ranunculus phragmites.*) Mountains of South Carolina. N. C. Fl. April.

Bull. Plantes Vén. de France; Linn. Veg. M. Med. 109; Fl. Scotica, 287; Chomel, Plantes Usuelles, ii, 376; Dict. des Sc. Méd. lxv, 194; Mér. and de L. Dict. de M. Méd. i, 292; U. S. Disp. 1228. It is said to be extremely acrid—even small doses producing a great disturbance of the stomach; employed as a rubefacient in fevers, gout, and rheumatism, and as a vesicatory in removing corns from the feet. It is reported to have proved a speedy cure for tinea capitis, and the flowers have been used in violent headaches; Linnæus says that the plant produces a discharge of urine, attended with dysentery, in cattle which feed on it. It contains a principle called *anemonin.*

Most of the species of Anemone, says Wilson, Rural Cyc., are acrimonious and detersive. "An infusion of Anemone is said to remove woman's obstructions, and to increase her milk; the bulbous roots when chewed are said to strengthen the gums and preserve the teeth; a decoction of the roots is said to cleanse corrosive ulcers, and heal inflammation in the eyes; the flowers, boiled in oil, are said to have the property of thickening the hair, and Anemone ointment is said to be a good eye-salve, and a useful application to ulcers and external inflammations," all which I introduce for what it may be worth. No doubt the oil furnished by it imparts some property to the plant, and, like tannin in all the astringent plants, accounts for the slight medicinal effect which results from their use. An improved knowledge will, one day, determine the exact position in value of the whole vegetable kingdom, but for a while we must be contented with the publication of much that is vague and uncertain. The unexpected discoveries of Ipecacuanha, Cinchona, Veratrum viride, etc., warn us not to discard, upon a superficial examination, all those popularly considered as of trivial importance.

LIVERWORT. { *Hepatica triloba*, Chaix. / *Anemone hepatica*, Linn. } Grows in light soils, upper districts, and in Georgia and North Carolina. Collected by Mr. Ravenel at the Eutaw battle-ground, St. John's, Berkley; sent to me also from Abbeville district.

U. S. Disp. 368; Raf. Med. Fl. i, 238; Lind. Nat. Syst. 81. A tonic and astringent, supposed by some to possess deobstruent virtues. It has been used to a considerable extent in hæmoptysis and chronic cough; but Wood says it has fallen into neglect.

ORANGE ROOT; YELLOW ROOT; TURMERIC; INDIAN DYE; GOLDEN SEAL, (*Hydrastis Canadensis*, W.) Grows in rich soils, among the mountains of North and South Carolina and Georgia. Fl. May.

Lind. Nat. Syst. 6; Bart. M. Bot. ii, 21; Veg. Mat. Med. ii, 17; Raf. Med. Fl. i, 251; Griffith, Med. Bot. 82. It has a narcotic smell; used in this country as a tonic. The root was known to the Indians, from the brilliant yellow color which it yields. This appears to be permanent, and might be applied in the arts. Martin, in the Trans. Phil. Soc. 1783, in his Observations on the

Dyes used by the Aborigines, states, from his own experience, that it was found serviceable in coloring silks, wool and linen. With indigo, it yielded a rich green. Griffith mentions it as a powerful bitter tonic, much used in the West as a wash in chronic ophthalmia. In its fresh state, supposed to be narcotic. Tincture, decoction, or powder employed. Dose of powder, thirty to sixty grains. Dr. Norcum, of Edenton, informs me that the infusion is used successfully in gonorrhœa.

The American Chemical Institute and Tilden & Co., prepare from this plant two principles, one resinous, Hydrastina, which is laxative and tonic, given in doses of one to five grains; the other an alkaloid Hydrastine or Hydrastina, the latter soluble in alcohol, water and ether, whilst the first is only sparingly soluble. Hydrastine is given in the same doses. In over dose it is said to produce almost identical effects with sulph. of quinine, viz: a sense of tightness, buzzing and ringing in the ears, reducing the pulse and producing sedation. In ordinaty doses it is tonic and astringent and it is claimed to have great power in intermittent fever. It is often prescribed with Podophyllin. This plant yields *berberina* abundantly, which Dr. Wood thinks should be examined for its antiperiodic properties—U. S. Disp. 12th ed., Am. J. Pharm., April 1861. Am. J. Sc. and Arts Jan. 1862 and July 1863. It is now placed in the primary list U. S. Disp. The following summary of the qualities of this plant is given by Dr. Wood: While all admit its tonic properties, it is considered by different practitioners as aperient, alterative in its influence on the mucous membranes, cholagogue, deobstruent in reference to the glands generally, diuretic, antiseptic, etc. It has been employed in dyspepsia and other affections requiring tonic treatment, in jaundice and other functional disorders of the liver, as a laxative in constipation and piles, and as an alterative in various diseases of the mucous membranes, as catarrh, chronic enteritis, cystorrhœa, lucorrhœa, gonorrhœa, etc., being used in the latter complaint internally and locally. By some it is used as one of the best substitutes for quinia in intermittents. As an injection in gonorrhœa Dr. McCann, of Martinsburg, Ohio, made a decoction in the proportion of a drachm of the dried root to a pint of water, and injected a syringe full three times a day. The plant is used in the form of decoction, infusion tincture and extract. The Eclectics

give their *hydrastin* in doses of three to five grains. See also a volume entitled "Positive Medical Agents, New York.'

MARSH MARYGOLD; COLT FOOT; GROUND IVY, (*Caltha palustris*, L. *Var. parnassifolia*, T. & G.) Cedar Swamps, S. C., (Pursh); Chap. Flora. The flower buds are pickled for use as a substitute for capers. The juice of the fresh roots is acrid and caustic, but according to Linnæus, by drying, grinding and washing the roots, furnish a very palatable bread. A syrup prepared from this plant is a popular remedy for coughs. Darlington's Flora Cest. The Colt's Foot of the U. S. Disp. is *Tussilago farfara*.

CELERY LEAVED CROW FOOT, (*Ranunculus sceleratus*, L. T. and Gray). Grows in bogs; abundant around Charleston. Newbern, Croom. Fl. May.

Bull. Plantes Vén. de France, 143; Dém. Elém de Bot. Lightfoot's Fl. Scotica, 295; U. S. Disp. 584; Mér and de L. Dict. de M. Méd. 620, and the Supplem. 1846, 620; Dioscorides, lib. vi, c. iv; Orfila, Toxicol, Gén. ii, 90; Big. Am. Med. Bot. iii, 65; Griffith, Med. Bot. 84.

The juice possesses remarkable caustic powers, raising a blister if applied topically, and often in doses of two drops exciting fatal inflammation along the whole track of the alimentary canal. Some, however, say that this property is not constant, as it is of a volatile nature, and is dissipated by heat. According to Mérat, the Bedouins use it as a rubefacient, and it is applied in sciatica, forming a substitute for cantharides. Annal. Univ. de Méd. 1843. It has been administered with success in asthma, icterus, dysuria, rheumatism, pneumonia and fixed pains. When it acts as a vesicant, it has not the disadvantage of producing strangury. Bigelow says the volatile principle may be collected by distillation and preserved in closely-stopped bottles. Tilebein relates that the distilled water is excessively acrid, and on cooling, deposits crystals, which are almost insoluble in any menstruum. Precipitates are caused by muriate of tin and acetate of lead. The boiled root may be eaten.

Ranunculus repens, Linn. } Grows in shady woods, and among
" *nitidus*, Ell. Sk. } the mountains. Fl. Aug.

U. S. Dis. 584. This has also a rubefacient and epispastic operation. Big. Am. Med. Bot. iii, 65. Very similar to the above in its mode of action.

·TALL LARKSPUR; (*Delphinium exallatum*, Ait.) Mts. of North Carolina and Northward.

Dr. Wood says that the seeds have been used for a similar purpose with those of the Larkspur—a tincture made by macerating an ounce of them in a pint of dilute alcohol, being used in doses of ten drops, gradually increased, in cases of spasmodic asthma and dropsy. U. S. Disp.

LARKSPUR, N. C.; (*Delphinium consolida*, L.) Becoming naturalized. The plant has astringent properties, the seeds are acrid, and its flowers yield a fine blue dye.

My friend, Dr. Carmichael, of Fredericksburg, Va., informs me that the tincture of the plant is destructive to insects, and usefully applied to the heads of children infested with them. It possesses an active principle called Delphinia. Am. J. Ph. v, i,, and xi, viii. W. Wick obtained aconitic acid from the expressed juice—Journ. de Pharm., Julliet, 1854, and U. S. D., 12th ed. In his Statistics of South Carolina, Mills says that from the expressed juice of the petals with a little alum, a good blue may be obtained.

BLACK SNAKEROOT; COHOSH, (*Cimicifuga racemosa*, Torrey; *Actæa racemosa*, L. & Willd). Grows throughout the Southern States. Fl. July.

Linnæus, Veg. Mat. Med. 102 (see *Actæa*). The root is used in the debility of females attendant upon uterine disorder; and, in its action, is thought to have a special affinity for this organ. It has also a decided effect upon some nervous affections, especially chorea. See Journal Phil. Coll. Pharm. vi, 20, and Dr. Young's notice of it in the Am. Journal Med. Sc. v, 310. "We have administered this medicine in chorea with complete success, after the failure of purgatives and metallic tonics; and have also derived the happiest effects from it in cases of convulsions recurring periodically, and connected with uterine disorder." Wood, U. S. Disp. The powdered root is employed, a teaspoonful three times a day. It is a stimulating tonic, increasing the secretion of the skin, kidneys and lungs. Mérat, in the Dict. de Mat. Méd., adds the authority of Dr. Kirkbride in support of the efficacy of this plant in chorea, who advises that a purgative be premised, when it may be given for several days, and then discontinued, to be resumed again; frictions should at the same time be made upon the surface with the tincture. See

the Supplem. 1846, to the Dict. de. M. Méd. cit. sup. Dr. Hildreth has found this plant, in combination with iodine, very advantageous in the early stages of phthisis. Am. Journal Med. Sc. Oct. 1842. The decoction is the most useful form; one ounce of the bruised root is boiled in a pint of water, of which a half pint to one pint may be taken during the day. Dr. Physick also had known it to cure cases of chorea; and Mérat and de L., in the 1st vol. of op. cit. p. 67 (See *Actæa*), say that it partakes of the properties of *A. brachipetala.* According to Chapman, it produces free nausea, with abundant expectoration, succeeded by nervous trembling, vertigo, and a remarkable slowness of the pulse. Dr. Garden administered the tincture for phthisis. London Med. Journal, li, 245. Dr. N. S. Davis uniformly found it to lessen the force and frequency of the pulse, to soothe pain and allay irritability. Trans. Am. Med. Assoc. 1, 352. Hildreth had also observed its influence on the circulation. Barton employed it as an astringent, which property it owes to the gallic acid it contains. He also gave it in putrid sore throat. In New Jersey, a decoction of the root is said to cure itch; and in North Carolina, it is given as a drench for cattle, in the disease called murrain. Shec Flora Carol. 91; Carson's Illust. Med. Bot. i, p. 9, 1847. See anal. in Am. Journal Pharm. vi, 20, 1843 and xxxiii, 396. According to Mr. Tilghman, it contains gum; starch; sugar; resin; wax; tannin; gallic acid; salts of potassa; lime; magnesia; iron, etc. The ethereal extract contains most of its virtues. The Eclectics prepare from this plant a resin which they call *cimicifugin,* from a saturated tincture of the root precipitated by water—used in anomalous nervous disorders and puerperal hypochondriasis. Dose, a grain. See, also, Jones, in the Journal de Pharm. x, 670; and Journal Phil. Coll. Pharm. vi, 14; Griffith, Med. Bot. 92. He remarks that its greatest efficacy has been exhibited in rheumatism, in the form of a tincture; the power of the root appearing to depend on the volatile oil and bitter resin, both of which are soluble in alcohol, and partially so in water. Dr. Tully, Mat. Med. p. 1358, uses it as an ecbolic to excite the uterine organs. He says: "It never narcotizes the child." Dr. D. A. Morse, of Ohio, in Med. Rep. recommends it as a nervous sedative of great value, and to procure sleep after physical exertion. He often combines it with quinine. Bates in Journ. of Mat. Med., 1867.

BANEBERRY; WHITE COHOSH, (*Actæa alba*, Big.; *Actæa pachypoda*, Ell.) Rocky Woods, Mts. of South Carolina; North Carolina.

Mr. F. Stearns in his accounts of the Medicinal plants of Michigan, speaks of the rhizoma of this plant as being violently purgative. (Proc. of Am. Pharm. Assoc., 1858, p. 240). U. S. Disp. 12th ed.

YELLOW ROOT, (*Zanthorrihza apiifolia*. L'Her.) Upper, and mountainous districts. North Carolina; Fl. April.

U. S. Disp. 745; Bart. Med. Bot. ii, 203; New York Med. Repos. 291; Lind. Nat. Syst. 6; Griffith, Med. Bot. 95; Elliott's Bot., Med. note i, 376; Stokes, Med. Bot. ii, 194.

The bark possesses pure bitter tonic properties, closely analogous to those of colombo and quassia. Dr. P. C. Barton thinks it a more powerful bitter than the former of these. It was given by Dr. Woodhouse in doses of forty grains in dyspepsia; a decoction is also employed. The shrub contains a gum and resin, both of which are intensely bitter. Alchohol is the best menstruum. Its tinctorial powers were known to the Indians. It yields plentifully a coloring matter, a drab being imparted by it to wool, and rich yellow to silk; without a mordant it does not affect cotton or linen; with Prussian blue it strikes a dull olive green color. It yields the alkaloid *berberina*.

TWIN LEAF, (*Jeffersonia diphylla*. Pers.) Rich shady woods, Tennessee.

The decoction of this plant is used by the vegetable practitioners and Indian doctors as a diuretic in dropsy, and as an external application to sores, ulcers, etc.

To the above meagre outlines published in the first edition of this work, the 12th ed. U. S. Disp. contains the following additional particulars. The plant has been analyzed by Mr. E. S. Wayne, of Cincinnati, and found to contain albumen, sugar, lignin, pectin, a fatty and a hard resin, and a peculiar acrid principle resembling polygalic acid, in which it is supposed that the virtues of the root reside. The root is said to be emetic in large doses, tonic and expectorant in smaller, and not unlike seneka, as a substitute for which it is sometimes used. (Am. J. Pharm. XXVII). According to Prof. Mayer, of New York, the rhizome of the plant contains a small quantity of berberina and another

alkaloid which is white, and in large proportion, as may be inferred, adds Dr. Wood, from the reactions noticed by Mr. Bentley, of London; the pectin of Mr. Wayne he considers to be saponiu. Am. J. Pharm. March, 1863.

WILD JALAP; MAY-APPLE; MANDRAKE; WILD LEMON; DUCK WEED, (*Podophyllum peltatum.* L.) Diffused in rich woods; grows in Abbeville and Sumter districts; collected in St. John's Berkley; vicinity of Charleston, Bach.; Newbern. I saw it at Porsmouth, Virginia. It should be distinguished from the "may-apple," or may-pop of our corn fields. (See *Passiflora*). Fl. March.

Pe. Mat. Med. ii, 749; Bell's Pract. Dict.; Drayton's View S. C. 73; Royle Mat. Med. 573; Frost's Elems. 137; Eb. Mat. Med. i, 205; Ed. and Vav. Mat. Méd. i, 514; U. S. Disp. 556; Big. Am. Med. Bot. ii, 34; Bart. Med. Bot. i, 9; Journal Phil. Coll. Pharm. iii, 873; Med. Record, iii, 332; Ball and Gar. Mat. Med. 193; Zchoepf, M. M. 86; Mér. and de L. Dict. de Mat. Méd. v. 207; Chap. Mat. Med. and Therap. 209; Coxe, Am. Disp. 478; Lind. Nat. Syst. Bot.

Bigelow says it is a sure and active cathartic. "We hardly know any native plant that answers better the common purpose of jalap, aloes, and rhubarb." The Shakers prepare an extract, which is much esteemed as a mild cathartic. By the experiments of Dr. Burgon, in the Am. Med. Recorder, it is useful in combination with calomel; ten grains of the latter with twenty of the podophyllum. In bilious affections it usually supersedes the necessity of an emetic previous to a cathartic; and by this means two desirable effects are produced by one agent. Big. Appendix, iii, 187; Griffith, Med. Bot. 116. It has been recommended in dropsy, from the abundant evacuations which it produces. According to Staples, it contains resin and starch; and Dr. Hodgson has given the name podophylline to the peculiar substance it contains. See Journal Phil. Coll. Pharm.; Carson's Illust. of Med. Botany, pt. i. An officinal extract is prepared, given in doses of 5 to 15 grains. The leaves are purgative, and sometimes produce nausea in irritable stomachs; the fruit is eatable. It was employed by the Cherokees as an anthelmintic; a few drops poured into the ear are said to restore the power of hearing. The plant has also been found to afford speedy relief

in incontinence of urine. Dr. McBride made great use of it during his practice in St. John's Berkley, S. C.; he said that it answers all the purposes of officinal jalap, "producing copious liquid discharges with no griping." The powered root is applied as a dressing for ulcers; it is said to restrain excessive granulations, sprinkled over the surface. In a communication to me from Dr. Douglass, of Chester District, S. C., his correspondent, Mr. McKeown, considers the root too drastic as a purge; he adds that the powdered root, mixed with equal parts of resin, acts as a powerful caustic, and is used by farriers for escharotic purposes. I have employed this plant among negroes as a substitute for jalap and the ordinary carthartics, and find that it answers every purpose, being easily prepared by the person having charge of them. Thirty grains of the root in substance were given, or an infusion of one ounce in a pint of water, of which a wineglassful three times a day is the dose; employing the Poplar bark, *Liriodendron tulipifera*, as a substitute for quinine during the stage of intermission of all mild cases of intermittent fever. I would invite the particular attention of planters to the extensive use of these medicines upon their plantations. I have caused them to be used on one on which upward of a hundred negroes resided, and I found that during a period of seven months, including the warm months of summer, they were used in all cases, and apparently fulfilled every indication. No detailed statement of these could be obtained, as it was administered by one of their own number; but large quantities of them were required. The plant, from the examinations of Mayer, Hodgson, Marsch, and Lewis, is shown to yield berberina and saponiu. The resin *podophyllin*, is purgative in doses of two or three grains, and is largely employed by some practitioners. See also U. S. Disp.; Journ. Phil. Col. Pharm. 1863, July and iii. 273, Am. J. Ph. XIX. 165, and March, 1863.

Dr. Joseph Parrish (Practical Pharmacy, 2nd edition, page 190), cites Podophyllin as the most popular and widely known of the whole class of "eclectic concentrated medicines," and he furnishes the processes for its preparation by F. D. Mill & Co., of Cincinnati (see also, Am. J. Pharm. XXIII. 329); according to Dr. Parrish's experiment the roots yield 3¾ per cent. of Podophyllin. In small doses ¼ to 1 grain, it is said to operate as an alternative and chologogue. It is claimed for this remedy

that it is a regulator of almost all the secretions, tending to restore them to normal activity and that it is a complete substitute for mercury even to the extent in some cases of producing ptyalism. Its efficacy is greatly increased by trituration with four to ten times its weight of sugar of milk. Caulophyllin combined with it is said to materially lessen its painful and disagreeable effects. A compound of Podophyllin with ten parts of Leptandrin and ten parts of sugar, is much esteemed as an alterative in dyspepsia, hepatitis, etc.; see King's Eclectic Disp., Parrish, Op. cit. The Extract and resin are often used with mercury and other cathartics. Dr. Wood says that in minute doses frequently repeated Podophyllum has been thought to diminish the frequency of the pulse and relieve cough, and for these effects has been given in hæmopysis, catarrhs and other pulmonary affections. Op. cit. The soft pulp contained within the rind of the fruit has a very peculiar musky taste, which is relished by many persons. The pulp is squeezed into a wineglass, and with the addition of a little old Maderia and sugar, it is said to be equal to the golden granadilla of the tropics. Am. Farmer, vol. 14; Farmer's Encyc. I have observed in the lower districts of South Carolina, that the fruit generally drops before it becomes fully matured. I have never been able to find any ripe seeds.

PAPAVERACEÆ. (*The Poppy Tribe.*)

Narcotic properties generally prevail throughout this order. Seeds are universally oily—seldom narcotic. Europe is the principal seat of the papaveraceæ; but several species included under it are found in North America, beyond the tropic. Most of them are annuals, the perennials being chiefly natives of mountainous tracts.

OPIUM POPPY, (*Papaver Somniferum*). Thaër, in his Principles of Agriculture, in speaking of the cultivation of the poppy as an oil-bearing plant, says: "The color of the flower is unimportant. The seed is either white or black. Some persons think that the black-seeded variety is more productive, others give the preference to the white in this respect. The white seed is the more agreeable to the taste, as likewise the oil expressed from it. That variety of poppy is preferred whose heads or capsules when ripe assume a slightly bluish tinge. The structure of the capsules is of more consequence; for there is a variety in which the

envelope of the capsule dehisces spontaneously when ripe, so that the seed is easily shed; and another, in which the seed remains enclosed within the capsules, which must be opened in order to extract it." "The poppy may become one of the most profitable crops, if we have the means of disposing of the seed, or if we knew how to extract the oil. By proper cultivation it may be made to produce from nine to ten bushels of seed per acre, and one bushel yields twenty-four pounds of good oil. This oil, especially the first portion, which is cold-pressed, and mixed in the mill with slices of apple, is doubtless the purest kind of oil for the table, and the most agreeable that is known. It is inferior to none, excepting the finest Nice or Lucca oil. It is preferable to the second-rate oil of those places, and the peculiar taste of olive oil may be imparted to it by the addition of a small quantity of that oil of superfine quality." Principles of Agriculture, 457.

The oil of the poppy is bland, and not narcotic. "It is used both for food and light, and is considered a fifth more valuable than that of the colza. The cakes remaining after the expression of the oil are valuable for the fattening of swine; and the stalks for fuel. The ashes which remain after burning it are of the best kind of manure. If the seed be pressed in a mill used for the colza, or other oil, the greatest attention must be paid to cleaning it. The oil expressed in cold weather is much superior in quality to that obtained in warm weather, and the two must not be mixed." "Henry Colman's European Agriculture," vol. ii, 538, Boston, 1849. See his "Report on Flemish Agriculture, for method of growing the Poppy, Colza, Flax, Hemp, Hop, Mulberry, Beet, Olive, Grape," etc.; also "Thaër's Treatise on Agriculture." See Bené (*Sesamum*) for oils and their expression.

In Thornton's Family Herbal a very full and interesting account can be read of the cultivation of poppy in England, with the successful production of opium in considerable quantity. Forty pounds were made in one season by one person. Boys and girls were employed in incising the bulbs and gathering the gum.

A variety of the "common" or "opium poppy" (*P. somniferum*), indigenous to the warm and temperate parts of Europe and Asia, has been introduced, and a brief notice is contained

in Patent Office Report, 1855, p. xxi: "It has proved itself susceptible of easy cultivation on very rich soils. It is well adapted to the climate of the Middle and Southern States. The flowers of the 'white poppy' (*Papaver s. alba*), the variety with which the experiment was made, may be either entirely white or red, or may be fringed with purple, rose or lilac, variegated and edged with the same colors, but never occur blue or yellow, nor mixed with these colors, each petal being generally marked at the bottom with a black or purple spot. The seeds are black in the plants having purple flowers, and light-colored in those which are white; although the seeds of the latter, when of spontaneous growth, are sometimes black. The largest heads which are employed for medical or domestic use, are obtained from the single flowered kind, not only for the purpose of extracting opium, but also on account of the bland, esculent oil that is expressed from the seeds, which are simply emulsive, and contain none of the narcotic principle. For the latter purpose, if no other, its culture in this country is worthy of attention. Certainly it is an object worthy of public encouragement, as the annual amount of opium imported into the United States is valued at upward of $407,000." If this was true some years since, how much more essential to us is its production now (1862), when gum opium and morphine are so very difficult to obtain. Mills, in his Statistics of South Carolina, states that opium was extracted from the poppy in South Carolina, and that seven grains were obtained from each plant. Occupied in researches upon these subjects during the month of June (1862), under the order of the Surgeon-General, I was enabled to collect, in a few days, more than an ounce of gum opium, apparently of very excellent quality, having all the smell and taste of opium (which I have administered to the sick), from specimens of the red poppy found growing in a garden near Stateburgh, S. C. I have little doubt that all we require could be gathered by ladies and children within the Southern States, if only the slightest attention was paid to cultivating the plants in our gardens. It thrives well, and bears abundantly. It is not generally known that the gum which hardens after incising the capsules is then ready for use, and may be prescribed as gum opium, or laudanum and paregoric may be made from it with alcohol or whiskey.

The poppy, it is said, produces better when planted in the fall. With my present experience (June, 1863), I would say that this was essential in the climate of South Carolina and Georgia. It should be planted early in September; the plants are not killed during the winter, they thrive in the early spring, and the capsules are ready for incision in May. I find that the vitality of the seeds are not destroyed by the manipulations to which the capsules are subjected. Several attempts by the writer to obtain the poppy by planting several acres successively in April and May failed, the seeds not getting up. From a "garden square" planted in October, 1862, I obtained in May, 1863, from two gatherings, 5 drachms and 30 grains of gum opium, weighed after the mass had dried one month, of excellent quality judging by the smell and color. The experiment was hardly a fair one, as the second *récolte* was delayed too long. Twice the amount might have been collected. The land should be rich and finely worked; the seeds were not sown lightly.

Mr. Farmer, of Walterboro', S. C., reports through Surgeon Linning (June, 1863), that he also has succeeded in procuring enough for the use of his plantation. The writer has little doubt from the present beginnings that opium will become one of the ordinary staples of the country, as the plant thrives well as a volunteer. It should be remembered that poulty eat the young plants with avidity.

I quote the following from paper cited above:

The successful cultivation of the plant, however, requires the provision of good soil, appropriate manure, and careful management. The strength of the juice, according to Dr. Butler, of British India, depends much upon the quantity or moisture of the climate. A deficiency even of dew prevents the proper flow of the peculiar, narcotic, milky juice which abounds in every part of the plant, while an excess besides washing off this milk, causes additional mischief by separating the soluble from the insoluble parts of this drug. This not only deteriorates its quality, but increases the quantity of moisture, which must afterward be got rid of. The history of the poppy, as well as that of opium—its inspissated juice—are but imperfectly known. The oldest notices of this plant are found in the works of the early Greek physicians, in which mention is also made of the juice; but opium does not appear to have been so generally

employed as in modern times, as the notices respecting it would would have been numerous and clear. In the manufacture of opium in Persia or India, the juice is partially extracted, together with a considerable quantity of mucilage, by decoction. The liquor is strongly pressed out, suffered to settle, clarified with the white of eggs, and evaporated to a due consistence—yielding a fifth of the weight of the heads of extract, which possesses the virtues of opium in a very inferior degree, and is often employed to adulterate the genuine opium. The heads of the poppies are gathered as they ripen; and, as this happens at different periods, there are usually three or four gatherings in a year. The milky juice of the poppy in its more perfect state, which is the case only in warm climates, is extracted by incisions made in the capsules, and simply evaporated into the consistence in which it is known to commerce, under the name of opium.

In Turkey, the plants during their growth are carefully watered, and manured if necessary; the watering being more profuse as the period of flowering approaches, and until the heads are half grown, when the operation is discontinued, and the collection of the opium commences. At sunset longitudinal incisions are made upon each half-ripe capsule, not sufficiently deep to penetrate the internal cavity. The night dews favor the exudation of the juice, which is collected in the morning by scraping it from the wounds with a small iron scoop, and depositing the whole in an earthen pot, where it is worked in the sunshine with a wooden spatula, until it acquires a considerable degree of thickness. It is then formed into cakes by the hands, and placed in earthen pans to be further exsiccated, when it is covered with the leaves of the poppy, or some other plant.

In obtaining gum opium, the capsules are cut longitudinally only through the skin, though some advise that it should be done from below upward. I find longitudinal incisions the most economical. This is generally done late in the afternoon, the hardened gum being scraped off early next morning. Boys or girls can easily attend to this. If the capsules are cut only on one side, the same operations may be repeated on the other side, and a fresh supply of opium obtained. A knife with three or four edges, cutting about the twelfth or fourteenth part of an inch, is sometimes used. If the incision is too deep the juice passes within the poppy head.

Prof. Alston, of Edinburgh, long ago, says Thornton, ascertained that opium of good quality could be obtained in Great Britain, "having all the color, consistence, taste, smell, faculties, phenomena," etc., of opium. It has been calculated by Mr. Ball that more than fifty pounds of opium may be collected from one statute acre. Mr. Jones, in 1794, in the County of Middlesex, England, presented twenty-five pounds of opium to the Society of Arts, made by himself, which was ascertained by chemical examination, to be equal to the imported drug. The reader interested in the culture of the poppy, can find in Thornton's New Family Herbal, p. 516, a pretty full statement of the method of culture, the collection of the gum, etc., employed by Mr. Jones. In Love's report to the Society, he says: "Having a tap root, their size will, consequently, be proportioned to the depth of earth they are enabled to penetrate. Hence the necessity of land that will admit of deep ploughing. The fineness of the surface, too, is very essential. As the seed is small, and the plants on their first coming up so exceedingly tender, the bush harrow should always be used after those which are commonly employed." They should be so cultivated that the gatherer may not disturb the plants in collecting the juice. Mr. Jones is also in favor of autumnal sowing, planting in the month of September, by which means the plants attain sufficient size to endure the cold of winter; these were also found to produce more opium than those planted in March. The scarifications are described, Thornton's Herbal, 517, but any one can devise a knife for the purpose. In the Proc. of Am. Ph. Assoc., 1866, a specimen of Virginia opium exhibited contained 4 per cent. of morphia and 3.5 per cent. (approximately) of narcotina.

Mr. John Commins, of Charleston, has endeavored (1867) to extract the gum more economically from the whole plant, leaves, stalks and capsules, but it has been found impracticable. *Papaver dubium*, Corn poppy, introduced, grows in lower North Carolina, Curtis' Cat.

DEVIL'S FIG; PRICKLY POPPY; MEXICAN POPPY; THORN APPLE; YELLOW THISTLE, (*Argemone Mexicana*, Linn. D. C. Prodrom.) Charleston District, grows around buildings in rich spots; vicinity of Charleston; Newbern, N. C. Fl. July.

Mér. and de L. Dict. Univ. de M. Méd. i, 395; Journal de Pharmacie xiv, 73; Bull. des. Sci. Méd. de Mér. viii, 210; De

Cand. Essai, 116. The oil is said by some to be as active as that of the Croton tiglium; see the Supp. to Mér. and de L., 1846–'57, In Brazil, the leaves are employed as a cataplasm for driving off ulcers. The infusion is used in Mexico for its marked sudorific powers; the juice is found serviceable in chronic maladies of the skin. In Java, they employ it in inveterate cutaneous diseases, and as a caustic in chancres. Lind., in his Nat. Syst. Bot. 8, says that the seeds are narcotic, and are smoked with tobacco; Gardener's Mag. vi, 315. It is administered in the West Indies as a substitute for ipecacuanha, and the juice of the plant is considered by the native doctors of India as a valuable remedy in ophthalmia, either dropped in the eye or rubbed on the tarsus; it is also considered purgative and deobstruent. Ainslie, M. Med. Ind, 243; Prince Maximil. Travels, 214; Aublet, Hist. Guiane. Mérat, in the Supplem., 1846, says that, in Brazil, in the Isle of France, and in India, the oil is regarded as a purgative, not unlike castor oil, but more active—not, however, being attended with griping; thirty drops were found equivalent to the ounce of castor oil. They applied it in tinea capitis, and as an external application in headache occasioned by exposure to the rays of the sun. See Dr. Schort's examination of it. Dr. Muddie asserts that it induces anodyne effects; so much so, as to relieve, in an instant, the pains of colic. Med. Bot. Soc. London, 1830; Griffith's Med. Bot., 129. The plant abounds in a viscid, milky, acid juice, which, exposed to the air, becomes yellow, resembling gamboge. The flowers are said by DeCandolle, Essai, to be employed in Mexico as a hypnotic. A thorough examination of this plant might well repay the labor bestowed upon it. It is, apparently, native, says Chapman, in South Florida. "Its seeds are said to yield a narcotic substance as powerful as opium. A milky, glutinous juice flows from the whole plant; turns by exposure to the air into a fine bright yellow; and when reduced to the consistence of a firm gum, is not distinguishable from gamboge, and has, we believe, been brought into the market under the name of that drug. It has similar properties to gamboge, both as a medicine and as a pigment; and it has been administered in very small doses in cases of dropsy, jaundice, cutaneous eruption, and some other diseases." Wilson, Rural Cyc.

I collected a large number of the seeds of this plant near

Charleston, and experimented with the oil and tincture, but with no definite results. A long paper on the medical properties of the Mexican Poppy can be found in the Charleston Medical Journal, among the extracts. I cannot, at present, cite the volume, but it was during the editorial management of Dr. Cain and myself. The tincture was particularly recommended for the relief of colic and pain.

In the 12th Ed. U. S. Disp. M. Lepine is quoted as stating that the oil of the seeds has a cathartic property, and may be used in the arts (Journ. de Pharm. Julliet, 1861), and that according to Dr. W. Hamilton, that the seeds unite an anodyne and soporific with the cathartic property. In the hands of Dr. Afflecle, of Jamaica, they have proved useful given in emulsion in flatulent colic, in the dose of about 8 grains, repeated every half hour, till three doses were taken. The pain was relieved and the bowels opened. (Pharm. Journ. xii. 642.)

PUCCOON; BLOODROOT, (*Sanguinaria Canadensis*, Linn. Ell. Sk.) Diffused; vicinity of Charleston; Abbeville, Richland, and Fairfield Districts; collected in St. John's; N. C. Fl. March.

Drayton's View of S. C. 72; Bell's Pract. Dict. 404; Eberle, Mat. Med. 95; Lind. Nat. Syst. 8; U. S. Disp. 627; Royle, Mat. Med. 273; Pe. Mat. Med. and Therap. ii, 722; London Med. Chirurg. Trans. vol. i, Bart. M. Bot. i, 30; Ann. Lyceum Nat. Hist. New York, ii, 250; New York Med. and Phys. Journal, i, No. 2; Am. Journal Med. Sci. N. S. ii, 506; Journal Phil. Coll. Pharm. iii, 95; Ball and Gar. Mat. Med. 208; Big. Am. Med. Bot. i, 75; Schoepf, Mat. Med. 85; Barton's Collec. 28; Trans. Lond. Med. Soc. i, 179; Thacher's Disp. 331; Cutler, Mem. Am. Acad. i, 455; Mér. and de L. Dict. de M. Méd. vi, 208; Bull. des Sci. Méd. Fer. vi, 71; Edinb. Med. Journal, vii, 217; Shec. Flora Carol. 153; Carson's Illust. Med. Bot. i, 18, 1847. The root is narcotic, emetic and purgative in large doses; stimulant, expectorant, and diaphoretic, tonic in small. Dr. Dana found a found a peculiar principle in it, called *sanguinarina* (Ann. Lyceum Nat. Hist. New York). According to the experiments of Dr. Donney, of Maryland, in his inaugural Thesis, twenty-grain doses of the root induced nausea and vomiting, attended with heat of stomach, acceleration of pulse, and sometimes slight headache; the leaves are said to be endued with similar powers. "The seeds exert a marked influence on the nervous system,

occasioning torpor, languor, disordered vision, and dilatation of pupil." Dr. Bard, of New York, confirms this in his Inaugural Diss. It is an acrid narcotic, producing vomiting, and given in all diseases of the mucous membranes; employed in catarrh, typhoid pneumonia, croup, hooping-cough, and in arresting the progress of phthisis, and also in inflammatory rheumatism and jaundice. It was known to Schoepf; and Mérat states that it was serviceable in gonorrhœa. Dr. Israel Allen, of New York, says it acts with all the good effects of digitalis, in affections of the lungs—the infusion being preferred in these, as the tincture does not afford the active principle sufficiently strong; he adds, also, that it powerfully promotes diaphoresis in inflammatory rheumatism. Bigelow mentions it as an acrid narcotic, in small doses lessening the frequency of the pulse, somewhat analogous in its operation to that of digitalis—this, however, being its secondary effect. In still smaller doses, it is a stimulating tonic. The powdered root, snuffed up the nose, is powerfully sternutatory; it is applied as an escharotic to fungous flesh; and several polypi, of the soft kind, were cured by it in the hands of Dr. Smith, of Hanover. Mill says in his Statistics of S. C., published in 1826: "It is a deobstruent, and excellent in jaundice, old coughs, and bilious habits; the root powdered and mixed with a small quantity of calomel, and used as a snuff, has cured the polypus in the nose." Dr. Shanks, of Tennessee, also destroyed a gelatinous polypus with sanguinaria, after extraction had twice failed. Am. Journal Med. Sci. Oct., 1842. The decoction has also been used as a wash to ill-conditioned ulcers. Dr. McBride employed this plant to some extent, in his practice in St. John's Berkley, S. C., in jaundice, in doses of two to six grains of the root. He did not trust to it exclusively, but found it most effectual in those cases characterized by torpor of the liver, attended with colic and yellowness of the skin. See his letter to Dr. Bigelow. He gave, too, with success, in hydrothorax, the tincture in doses of sixty drops, three times a day, increased until nausea followed its employment. Eberle, in his work on Diseases of Children, p. 97, says that the powdered root is an excellent escharotic in ulceration of the umbilicus. Griffith's Med. Bot. 127. It is observed by some that the seeds are more narcotic than the root, inducing symptoms resembling those produced by stramonium. The dose of the powder as an

emetic, x–xx grs.; as a stimulating expectorant, iii–v grs.; or an infusion of one-half ounce of the root to one pint of water—dose, a tablespoonful; of the tincture, it is one-half a drachm; a larger quantity acts as an emetic. The tincture is made by adding two ounces of the bruised root to one pint of alcohol. Macerate fourteen days. It is expectorant and alterative. Dr. Donney says the leaves are administered in veterinary practice in Maryland, to produce sweating, and to facilitate the shedding of hair in the Spring. Dr. Griffith is convinced of its efficacy in this respect, and he has also given the fresh root mixed with the food, at intervals, to destroy bots in horses—one or two roots proving sufficient. In a communication from Dr. Isaac Branch, of Abbeville District, S. C., he informs me that he has for many years employed the decoction of the root in croup; he prefers it to any other single remedy; and, by persisting in it till emesis is produced, he is of the opinion that it prevents the formation of the diphtheritic membrane. From his own experience, he considers it a specific in the early stages of the disease, preferring, for infants, the infusion to the tincture, as the difficulty of exciting vomiting frequently renders it necessary to give more of the alcohol than would be prudent. He finds it convenient, when called to a case of croup, to add to thirty grains of the powdered, or bruised root, a teacupful of boiling water, allowing it to steep for ten or fifteen minutes over the fire, when it may be given in teaspoonful doses, frequently repeated, until vomiting is induced; if the patient is relieved, continue it in doses short of the emetic point, every hour or two, increasing it in frequency and amount should the symptoms require it. Dr. B. is of the opinion that it owes its value to three qualities combined: an acrid, an emetic, and a deobstruent property—the latter acting on the glandular system. It possesses, also, the peculiar advantage of not producing bad effects by accumulation; a teacupful not debilitating any more than a smaller quantity, and neither inducing prostration, which, in the disease in question, is an important consideration. If the patient's skin is hot and dry, the addition of a few grains of ipecacuanha is advised. The experience of Dr. Branch corroborates that of others respecting the value of the tincture, in doses of ten to fifteen drops, given three or four times a day, as an expectorant in chronic cough. In emetic doses, it proves a

useful promoter of expectoration in pneumonia. The decoction of the root, taken in small doses, may be used wherever a nauseant and expectorant is required, and will aid in preventing the advance of colds, croup, pneumonia, etc. The juice of the root was used by the Indians as a red pigment, and it has been applied to the arts. Dr. Donney says that the sulph. of alumina will partially fix the color in woolen stuffs, and the murio. sulph. of lead in cotton and linen. The stain, applied to the unbroken skin, is not indelible. Lawson, in his account of Carolina, says, that the *Puccoon* is *Batschia canescens* (*Lithospermum canescens*), growing in upper districts. See Pursh's Flora and Croom's Catalogue.

The above was contained in my report on Med. Botany of S. C., published in 1849. Since that period, I have used the Tincture of Sanguinaria largely during five years attendance upon the Marine Hospital, and in private practice. I employ no vegetable substance so constantly, as an addition to cough mixtures, and as an alterative and tonic, when I think the functions of the liver not sufficiently active. We must avoid adding too much of the tincture to any mixture, lest it convert it into a nauseant or emetic. I can only say that it has proved a highly satisfactory agent in my hands as a tonic, alterative, and expectorant. (See Boneset, (*Eupatorium perfol. iatum*), for combinations of that and Sanguinaria in pneumonias and Formulæ at the end of this volume.)

Dr. J. B. Ancrum, of Charleston, informed me in 1867, that he had repeatedly found benefit from the local application of the powdered root to scrofulous ulcers, administering it also internally in doses of a few grains several times a day. From a suggestion made to him by a soldier during the late war he used it internally with much satisfaction in scurvy, and the powdered root was used in making a gargle, and was also given internally.

I have repeatedly employed the tincture with advantage in Jaundice, giving an occasional mercurial at night; thus avoiding the prostration which is so marked a feature of this disease as is often the case when managed exclusively by mercury.

In the 12th ed. of the U. S. Disp. 1866, Dr. Mothershead paper (from Wood's Quarterly Retrosp. 280) is quoted, where he

speaks in the strongest terms of its efficacy as an excitant to the liver given in alterative doses.

Prof. Wood says in reference to *Sanguinaria :* The late Dr. Wm. Tully found it in large doses to produce vertigo, dilatation of the pupil, a haggard expression of the face, nausea, diminished frequency and irregularity of the pulse. Prof. R. P. Thomas, of Philadelphia, who experimented with it on himself and others, in medicinal doses, using both the alkaloid and its salts, gave the following statement of its powers: In doses varying from one-twelfth to one-eighth of a grain it acted as an expectorant without disturbing the stomach. One-sixth or one-fourth of a grain given every two or three hours generally produced nausea and sometimes vomiting. Half a grain in solution, given at intervals of ten minutes, almost invariably vomited after the second or third dose. Under the influence of one-eighth or one-sixth of a grain given every three or four hours, for two days or more, the pulse was generally reduced from five to fifteen beats in the minute. He found no alterative effect, and none of any kind directly upon the liver (Proc. of A. M. Med. Assoc., 1863) U. S. Disp.

A fluid extract is prepared, of which the dose as an emetic is from ten to twenty minims.

FUMITORY, (*Fumaria officinalis,* Linn. Hook. Fl. Bo.) Natural, says Elliott, on John's Island, and at Mr. Middleton's on Ashley River. Not in Curtis' Cat.

This plant received great attention in former times, and was almost universally employed. Pliny speaks of it, lib. 25, c. 13. According to Hoffman and Boerhaave, the juice taken in large doses is diuretic and laxative. Great confidence was placed in its virtues by Cullen. Mat. Med. ii, 77. In the Dém. Élém. de Bot., it is referred to as a diuretic and detersive aperient, employed as a purifier of the blood in scrofulous and cutaneous diseases. It was administered in amenorrhœa, loss of appetite, and hypochondriacal affections; Fl. Scotica, 379. Boerhaave frequently prescribed it in jaundice and bilious colics. Thornton, in his Fam. Herb. 628, asserts that he had experienced its value in cutaneous diseases. Its acrimonious property is volatile; hence, it should be given in whey. Mér. and de L. Dict.

de M. Méd. iii, 310; Fl. Méd. iv, 153. "A marked bitter, which increases on being dried." A popular depurative remedy, which augments the action of the organs, and therefore useful in the diseases specified. Mérat says, it was very generally allowed to be a specific in elephantiasis, acting without any evacuation or appreciable effect. Barbier, M. Med. 381; U. S. Disp. 1254. An extract of the expressed juice, or a decoction, throws out upon its surface a copious saline efflorescence. "The plant indeed abounds in saline substances." Griffith, Med. Bot. 118. It is still employed in France; given in the form of decoction, extract, syrup, or expressed juice.

In observing the enormous amount of potash said by Ure to exist in the ashes of this plant (fourth London edition, 1853), I can now well understand some of the statements made above, which I had published several years since in my report to the American Medical Association. It is another evidence of the light thrown upon any subject by facts gathered from different sources and by independent inquirers. See article "Potash." Wormwood, artemisia, tobacco, corn and rice stalks, etc., contain potash in large proportion. The two first mentioned in enormous amount relatively.

NELUMBIACEÆ. (*Nelumbo Tribe.*)

WATER CINQUEPIN; POND-NUTS, (*Nelumbium luteum*, W.) Fla. and northward, not common; Chap. N. C. The fruit is a nut, the size of a cinquepin, of a sweetish flavor, and edible. It grows abundantly in the Santee canal.

NYMPHÆACEÆ. (*The Water Lily Tribe.*)

This order is generally considered anaphrodisiac, sedative, and narcotic. Their stems are bitter and astringent; they contain a considerable quanty of fecula, and, after repeated washings, are capable of being used for food.

SWEET-SCENTED WATER-LILY; POND-LILY, (*Nymphæa odorata*, Ait. Kew. and Ph.) Diffused in lower country of South Carolina; N. C. Roots immersed. Newbern. Fl. April.

U. S. Disp. 1280; Mat. Veg. Pract. 201; Thompson's Steam Pract.; Big. Am. Méd. Bot. 132; Cutler, Am. Trans. i, 456. "An anaphrodisiac." The root possesses a high degree of astringency, containing, according to Dr. Bigelow, tannin and gallic

acid. It is a popular remedy in bowel complaints; and is used as an astringent in gleet, fluor albus, etc. It also forms an excellent demulcent poultice for ulcers. Mér. and de L. Dict. de M. Méd. iv, 643; Bull. des. Sci. Méd. iii, 74. Ainslie, in his Mat. Med. Ind. ii, 381, says that, in India, they prepare with it a refreshing liniment for the head. Thompson employed this plant in the steam practice, and Matson recommends it as a gargle in sore throats.

CEPHALOTACEÆ.

We insert this order, the properties of which are unknown, merely to introduce the non-medicinal, but very remarkable plant, the

VENUS FLY-TRAP, (*Dionæa muscipula*, Ellis, L.) General C. C. Pinckney informed Mr. Elliott of the only locality of this interesting plant in South Carolina, viz.: on the margin of the Santee River, between Lynch's Ferry and the sea, particularly at Collins' and Bowman's bridges. Newbern. Fl. May. Its leaves possess great sensibility, and are prehensile: closing up and confining insects and any foreign body which comes in contact with it. See Curtis, in Bost. Journal Nat. Hist. i, p. 123, the article "Sarracenia" *infra*, and authors. "Miraculum naturæ! folia triloba, radicalia, ciliata, sensibilia, conduplicanda, insecta incarceranda. *Ellis, Epist. ad Linnæum.* Croom's Cat.

MAGNOLIACEÆ. (*The Magnolia Tribe.*)

This order is characterized by the possession of a bitter tonic taste, and fragrant flowers; the latter generally producing a decided action upon the nerves.

BAY; BEAVER TREE; SWAMP-LAUREL, (*Magnolia glauca*, L.) Diffused in damp pine lands. Charleston; Newbern. N. C. Fl. June.

Big. Am. Med. Bot. ii, 67; Bart. i, 77; U. S. Disp. 442; Pe. Mat. Med. ii, 733; Royle, Mat. Med. 248; Ball and Gar. 189; Michaux, N. Am. Sylvia, ii, 8; Kalm's Travels, i, 205; Humphries, Med. Comment. xviii; Mér. and de L. Dict. de M. Méd. iv, 193; Marshall's Arbust. 83; Bart. Mat. Med. 46; Price, Inaug. Diss. Phil. 1812; Lind. Nat. Syst. 18; Am. Herbal, 200;

Griffith, Med. Bot. 97. It is a stimulant, aromatic tonic, with considerable diaphoretic powers. The leaves, steeped in brandy, or a decoction of them, are valuable in pectoral affections, recent cold, etc. The tincture, made by macerating the fresh cones and seeds, or bark of root, in brandy, which best extracts its virtues, is much used as a popular remedy in rheumatism, and in intermittent fevers; and, according to Barton, in inflammatory gout. Lindley refers to it as a valuable tonic, but it is said to be destitute of tannin or gallic acid. The bark of the root, according to Griffith, was employed by the Indians to fulfil a variety of indications; the warm decoction acts as a gentle laxative, and subsequently as a sudorific, whilst the cold decoction, powder of, or tincture, is tonic. These have proved very beneficial in the hands of regular practitioners in the treatment of remittents of a typhoid character. It is supposed by many residing in the lower portions of South Carolina that this tree prevents the water of bogs and galls from generating malaria. It certainly seems that the water is much clearer in which the bay tree grows.* It is stated in a Journal, 1863, that Mr. Kerr, of Wilmington, N. C., has made good writing *ink* by boiling in water the bark of the bay or dwarf magnolia. Pillars for staircases of the color of mahogany are made of the red bay, an excellent material for inner work of houses, furniture, etc., as I have seen at Col. Singleton's, Clarendon, S. C. Its grain is so fine and bears so good a polish, says Mills in his Statistics of South Carolina, that it is used for catinet purposes. It also dies a beautiful black color.

*In that old work on Herbs, entitled the "English Physician," by Nicholas Culpepper, gentleman, "Student in Physic and Astrology," I have met with a great deal concerning the employment of herbs in medicine; but, from the absence of Botanical terms, it is impossible to ascertain, in many cases, what species are intended. In order to show the surprisingly superstitious credence then attached to the influence of Astrology, in determining the virtues of, and the times proper for gathering plants, and also the diversity of qualities attributed to them, I will extract a portion of what Culpepper says of the "Bay Tree:" "*Government and Virtues.*—That it is a Tree of the Sun, and under the celestial Sign Leo, and resisteth Witchcraft very potently, as also all the evils old Saturn can do to the body of man, and they are not a few; for it is the speech of one, and I am mistaken if it were not Mezaldus, that neither Witch nor Devil, Thunder nor Lightning, will hurt a man in the place where a Bay Tree is. Galen said that the leaves or bark do dry and heal very much, and the berries more than the leaves; the bark of the root is less sharp and hot, but more bitter, and hath some Astrictsion withal, whereby it is effectual to break the stone, and good to open the obstructions of the liver, spleen, and other inward parts,

MAGNOLIA, (*Magnolia grandiflora*, L.) This magnificent tree grows abundantly along the sea-coast, and in the streets of Charleston. Found sparingly in St. John's Berkley, forty-five miles from the ocean ; grows in Georgia, also, in North Carolina. Fl. May.

Mér. and de L. Dict. de. M. Méd. iv; 193 ; Pe. Mat. Med. and Therap. ii, 734 ; U. S. Disp. 444. The medicinal and chemical properties of these plants are supposed to be identical. See *M. glauca*. Mr. Proctor, in his analysis, Am. Journal Pharm. xiv. 95, and viii, 85, found in this species volatile oil, resin, and a crystallizable principle analogous to the *liriodendrine* of Prof. Emmett, obtained from the *L. tulipifera* growing in the Southern States (*vide L. tulip.*) Mérat says that in Mexico the seeds are employed with success in paralysis. *Loc. cit. sup.*

CUCUMBER TREE, (*Magnolia acuminata*, Linn. Mich.) Mountainous districts ; grows in Georgia, also, in North Carolina. Fl. July.

U. S. Disp. 443 ; Mx. N. Am. Sylvia, ii, 12 ; Lind. Nat. Syst 16. Lindley speaks particularly of the cones of this species being employed in the form of a spirituous tincture in rheumatic affections. Mér. and de L. Dict. de M. Méd. iv, 193 ; Griffith, Med. Bot. 98. Used as a prophylactic in autumnal fevers.

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which bring the Dropsy, Jaundice, etc. The Berries are very effectual against all poison of venomous creatures, and the sting of Wasps and Bees, as also against the pestilence, and other infectious diseases, and therefore put into sundry Treacles for the purpose. They, likewise, procure women's courses, and seven of them given to a woman in Sore Travel of child-birth do cause a speedy delivery, and expel the after-birth, and therefore are not to be taken by such as have not gone their time, lest they procure abortion, or cause labour too soon. They wonderfully help all cold and rheumatic distillations from the Brain to the Eyes, Lungs, or other parts, and being made into an Electuary with Honey, do help the Consumption, Old Coughs, Shortness of Breath, and thin Rheums, as also the Megrim. They mightily expel the wind, and provoke urines, help the mother, and kill the worms. The Leaves also work the like effects ; a bath of the decoction of the Leaves and Berries is singularly good for women to sit in that are troubled with the mother, or the diseases thereof, or the stopping of their courses, or for the diseases of the bladder, pains in the bowels by wind, and stopping of urine ; a decoction, etc., settleth the palate of the mouth in its place. The Oil made of the Berries is very comfortable. All Cold, Griefs of the Joints, Nerves, Arteries, Stomach, Belly, or Womb, and helpeth Palsies, Convulsions, Cramps, Aches, Tremblings, and Numbness in any part, weariness also, and pains that come by sore travelling. * * * * Pains in the Ears are also cured by dropping in some of the Oil, or by receiving into the Ears the fume of the decoction of the Berries through a funnel. It takes away the marks of Bruises ; it helpeth also the Itch, Scabs, and Weals in the Skin," etc.

The wood is soft, fine grained, and susceptible of a brilliant polish. It is sometimes sawed into boards, and used in the interior of wooden houses.

The flowers of most magnolias exhale a strong aromatic fragrance; the bark of all possesses a combination of bitter and hotly aromatic properties, without astringency, and that of many acts as a powerful medicine, in a similar way to Peruvian bark and Winter's bark. Wilson's Rural Cyc.

UMBRELLA TREE, { *Magnolia umbrella*, Lam. / *Magnolia tripetala*, Linn. and Ell. Sk. } Rare. Grows on the seacoast in rich soils; Newbern, N. C. Fl. June.

U. S. Disp. 443. It has a warm, aromatic odor, and is possessed of similar properties with the above. Mx. N. Am. Sylvia, ii, 19; Lind. Nat. Syst. 16. According to De Cand. and Mérat, Dict. de M. Méd. iv, 193, it acts so powerfully on the nerves as to induce sickness and headache.

LONG LEAVED MAGNOLIA, (*Magnolia macrophylla.* Mx. and Ell. Sk.) Grows on the mountains of South Carolina and North Carolina. It possesses the most magnificent foliage and flowers of any of our forest trees; the former are a foot or two in length; and the latter one foot in diameter. For its medicinal properties, see *M. glauca.* See, also, Griffith's Med. Bot. 98, and Ell. Sk, of Bot. of S. C.

ANISE SEED TREE, (*Illicium Floridanum and parviflorum*). These plants have the smell of anise seed, and should be examined. Griffith says the bark may be used as a substitute for cascarilla.

TULIP TREE; WHITE WOOD; POPLAR, (*Liriodendron tulipifera*, L.) Grows in swamps; diffused. Collected in St. John's, Charleston district; Columbia; Newbern, North Carolina. Fl. June.

Eberle, Mat. Med. ii, 308; U. S. Disp, 432; Rush, in Trans. Phil. Coll. Phy. 1798; Pe. Mat. Med. ii, 743; younger Michaux on Forest Trees of North America; Clayton, Phil. Trans. 8; Carey's Am. Museum, 12; Barton's Collec. Form. Mat. Med. 14; Thacher's U. S. Disp.; Big. Am. Med. Bot. ii, 107; Barton, i, 92; Ball. Gar. Mat. Med. 190; Mér. and de L. Dict. de M. Méd. iv, 130; Annal. de Chimie, lxxx, 215; Lind. Nat. Syst. Bot.;

Rogers' Inaug. Diss. 1802. This plant is tonic, diuretic and diaphoretic, and is generally considered one of the most valuable of the substitutes for Peruvian bark. It has been employed as a warm sudorific in the treatment of chronic rheumatism and gout; and Bigelow thinks it valuable as a stomachic. It was administered by Dr. Young and himself, combined with laudanum, in hysteria, and the former says that in all the materia medica he does not know of a more certain, speedy, and effectual remedy for that disease. See his letter to Governor Clayton. "He has never known it to fail in a single case of worms." Am. Museum, xii; Griffith, Med. Bot. 98. Rafinesque says the seeds are laxative, and the leaves are used as an external application for headache; they are washed and applied to the forehead. Mérat states that it is useful in phthisis, and he also refers to its vermifuge properties; employed in relaxed states of the stomach (*relâchemens*) and in the advanced stages of dysentery; this is corroborated by Thacher, Anc. Journal de Méd. lxx, 530; J. C. Mayer, Mém. on L. tulipifera, in the Mém de l'Acad. de Berlin, 1796; Ruch. Mém. sur le tulipier, Tilloch's Magazine; Hildebrande, Essai sur un nouveau succédané du quinquina in Ann. de Chim. lxvi, 201; Carminati sur les propriétés médicinales de l'écorce de tulipier. Its analysis, etc., in the Mem. of Roy. Inst. Lombardy, iii, 4; in the Supplem. to Mér. Dict. 1846, 436. M. Bouchardat advises, as the most preferable mode of exhibiting it in fevers, the wine made with the bark in equal parts of alcohol, to which he adds of white wine seven or eight times the amount of the alcoholic infusion. Bull. de Thérap. xix, 246; S. Cubiere's Hist. Tulip. Paris, 1800; see Tract. of Bouchardat in Ann. de Thérap. 75, 1841.

Dr. J. P.Emmet, in his Analysis in the Phil. J. Pharm. iii, 5, announced the discovery of a new principle in it—*liriodendrine*. This is solid, brittle and inodorous at 40°, fusible at 180°, and volatile at 270° It is soluble in alcohol, thought to be analogous to camphor, and to the principle found in the *Magnolia grandiflora*, and to consist of a resin and a volatile oil; hence the alcoholic tincture is preferable. The powdered bark in syrup is given to children who are liable to convulsions from worms, to promote their expulsion, and to strengthen the tone of the digestive organs. The bark should be pulverized and bottled. I have employed a strong infusion of the bark and root of this

plant as an anti-intermittent, among a number of negroes, and am much pleased with its efficacy. See the wild Jalap (*Podophyllum peltatum*,) in conjunction with which it was usually given. In Virginia, the decoction of the bark, with that of the *Cornus Florida* (dogwood) and the *Prinos verticillatus*, is given to horses affected with the bots. The poplar bark powdered is a valuable remedy as a tonic for horses. An infusion may be given to a horse, or the bark placed in his trough to be chewed. It gives tone to the digestive organs when they are "off their feed," in veterinary or jockey parlance. This tree I notice in unusual abundance along the line of railroad from Kingville to Columbia, S. C.; also in Spartanburg district, S. C., on the banks of streams. Dose of bark xx–xxx grs. It is a stimulant tonic, slightly diaphoretic. The infusion or decoction is made in the proportion of an ounce to a pint of water; dose one or two fluid ounces. Dose of the saturated tincture a fluid drachm. The wood is durable when not exposed to the weather—it is light, smooth, fine grained, and flexible; employed for various mechanical purposes—for carving and ornamental work; for making carriage and door panels, chairs, cabinets, etc. See also Mx. Forest Trees of America.

ANONACEÆ. (*The Papaw Tribe.*)

The plants of this order generally possess a powerful aromatic taste and smell in all the parts.

PAPAW; CUSTARD APPLE, } *Uvaria triloba*, T. and Gray. *Anona triloba*, Linn. *Asimina triloba*, Ell. Sk.

Grows in rich soils along streams. I have observed it in Fairfield and Spartanburg districts, South Carolina, and collected it in St. John's; Mr. Elliott says it is found at Beck's ferry, Savannah river, and North Carolina. Fl. May.

Dict. de Mat. Méd par Mér and de L. tom. i, 311. The rind of the fruit of the *A. triloba* of Linn. possesses a very active acid; pulp sometimes employed as a topical application in ulcers. Lind. Nat. Syst. Bot. 69. "Juice of unripe fruit is a powerful and efficient vermifuge; the powder of the seeds answers the same purpose; a principal constituent of the juice is fibrin—a product supposed peculiar to animal substances and to fungi." "The tree has, moreover, the property of rendering the

toughest animal substances tender by causing a separation of the muscular fibre—its very vapor even does this; newly killed meat suspended over the leaves, and even old hogs and poultry, when fed on the leaves and fruit, become 'tender in a few hours!'" Lind. loc. cit. The sap of the Papaw tree, (*Carica papaya*), which is extracted from the fruit by incision, is white and excessively viscous. In a specimen from the Isle of France, Vauquelin found a matter having the chemical properties of animal albumen, and lastly, fatty matter. Boussingault. This tree can be found in many parts of the South and I would invite examination into these very curious properties. For an excellent description of the Papaw, see Hooker in the Bot. Magazine, 898. At Pittsburgh, a spirituous liquor has been made from the fruit. Michaux notices that the cellular integument of the bark, and particularly that of the roots, exhales in summer a nauseous odor so strong as to occasion sickness if respired in confined air. Am. Sylva.

UMBELLIFERÆ. (*The Umbelliferous Tribe.*)

This order is nearly related to the Ranunculaceæ, and is generally found in cold countries, and on the mountains of tropical regions. The plants belonging to it are often poisonous, some virulently so; others are nutritive and wholesome; of the former, the hemlock is an example; of the latter, the celery and parsley.

PENNY WORT; WATER GRASS, (*Hydrocotyle umbellata*, L.) Grows in bogs and wet marshes; collected in St. John's; vicinity of Charleston; Newbern, N. C. Fl. May.

Mér and de L. Dict. de M. Méd. tom. iii, 560. Employed with great efficacy in Brazil against hypochondriacism. According to one author, the root is so valuable in diseases of the kidney as not to be replaced by any other medicines. It is emetic, diuretic and vulnerary. I see no mention of it in the English or American works.

SANICLE; BLACK SNAKEROOT, (*Sanicula Marylandica*, L.) Diffused, grows in shady spots; collected in St. John's; vicinity of Charleston; Newbern, N. C. Fl. July.

Mér. and de L. Dict. de M. Mèd. vi, 201. The Indians used it as we do sarsaparilla in syphilis, and also in diseases of the lungs.

In the 12th Ed. U. S. Disp. 1866, the author states that the root has an aromatic taste, and has been used as a domestic remedy in intermittent fever, and that Dr. J. B. Zabriskie has found it highly effectual in chorea. He considers it most efficient in substance, and he gives the powder to children of eight or ten years old, in the dose of half a drachm three times a day. Am. J. Med. S. C.; N. S. xii, 374.

BUTTON SNAKEROOT, (*Eryngium aquaticum*, L. *E. Yuccæfolium* of Mx.) Damp pine lands; diffused; collected in St. John's; Charleston; N. C. Fl. July.

Coxe, Am. Disp. 268; Ell. Bot. i, 343; Barton's Collec. i, 3; Frost's Elems. 280; U. S. Disp. 318; Mér. and de L. Dict. de M. Méd. iii, 145; Shec. Flora Carol. art. Button snakeroot, 310, 545. The decoction is diaphoretic, expectorant, and sometimes emetic. Elliott says it is preferred by some physicians to the seneka snakeroot. Barton, in his Collections, states that it is allied to the contrayerva of the shops. This plant is possessed of undoubted diuretic powers, and in combination with the *Iris versicolor* (blue flag), was much employed by Dr. McBride, of South Carolina, in dropsy. (See *I, versic.*) Great use is frequently made of them in popular practice. Shecut in his Flora Carol. 310, states that the decoction and tincture are given with benefit in pleurisies, colds, and most of the inflammatory diseases of the mucous passages. It is also said to act as an escharotic—keeping down fungus flesh, and preventing mortification. The root, when chewed, sensibly excites a flow of saliva. The *E. aromaticum*, an aromatic species, grows in East and South Florida; Baldwin in Chapman's Flora. The *E. maratimum*, of England, penetrates the soil to the depth of twenty feet.

FEVER WEED, (*Eryngium fœtidum*, L.) Elliott is doubtful whether this plant comes within the limits prescribed to us; it has, however, been noticed by writers as a S. C. species, and Michaux found it in Florida. T. and Gray are of the opinion that it is not a native of the United States. Vicinity of Charleston, Bachman; not in Curtis' Cat. Shec. Flora Carol. 54. "An admirable febrifuge." Mér. and de L. Dict. de M. Méd. iii, 145; Aublet, i, 284. Rotboll says it is a sedative, alterative, and febrifuge. Sprengel, Hist. de. la Méd. v, 467; Lind. Species, Pl. 336. Not included in Chapman's Flora.

ACONITE; MONKS-HOOD; WOLFSBANE; (*Aconitum uncinatum*, L.) Shady banks of streams among the mountains of the Southern States, and northward; also, *Aconitum reclinatum*, Gray. Mountains of N. C.

Most of the Aconites, particularly those with blue flowers, are highly poisonous. This species should be carefully experimented with, as it may be made to supply the tincture of aconite and aconitia for medicinal and chemical purposes. The active principal is "the most virulent poison known, not excepting prusic acid, as prepared by Moison, of London. 1–50 of a grain has endangered life." Wilson's Rural Encyc. Christison states that this species is possessed of an intense acrimony. See also works on Materia Medica. "The 1–100 part of a grain has produced a feeling of numbness, weight, and constriction, which has lasted a whole day." The tincture of aconite is more manageable, and is useful as an external anæsthetic in frontal neuralgia, local pains, etc. The writer has used it largely in this way whilst in charge of the Marine Hospital, Charleston, and with chloroform and glycerine to relieve the itching in prurigo and camp itch (1868). No remedy, save chloroform, equals it when applied locally for the relief of pain. The tincture may be combined with oil and chloroform, as a liniment in rheumatism. See Puff Ball (*Lycoperdon*), the dust of which is said to be a good anæsthetic agent.

AM. HEMLOCK; SNAKE-WEED; BEAVER POISON, (*Cicuta maculata*, L. Walt. Fl., Carolina). Grows in bogs and inundated land; collected in St. John's; Charleston; Newbern, N. C. Fl. Aug.

U. S. Disp. 1242; Barton's Collec. 1846; Mér. and de L. Dict. de M. Méd. ii, 282; Big. Am. Med. Bot. i, 125; Schœpf, M. Med. 36; Stockbridge, N. England Journal, iii, 334; Mitchell, Ely, and Muhlenburg, Med. Repos. xvii, 303; Stearns, Am. Herbal, 172. The leaves, flowers, and seeds are resolvent, powerfully narcotic, sedative, and anodyne. It resembles conium in its effects, and is used as a substitute for it. "It relieves pain from cancer more powerfully than opium;" employed in ill-conditioned ulcers, gleets, painful uterine discharges, venereal ulcers, epilepsies, and convulsions; it promotes perspiration and urine, and, externally applied, disperses hard tumours. It is closely

analogous to the European species, the *C. virosa;* Bigelow says identical with it. The dose of the leaves in powder is one to two grains three times a day, in infusion, or one grain of the extract, increasing it as the system becomes tolerant. This plant has repeatedly occasioned the death of those mistaking it for others. An active emetic, to which an infusion of galls may be added, will generally give relief. The vegetable acids, lemon juice, and vinegar, neutralize its effects; and strong tea and coffee are the best antidotes for the stupor which follows its employment.

Dr. Stearns, in his account of the plants of Michigan (Proc. Am. Pharm. Assoc. 1858, 253) states that Dr. Norton, of Minnesota, highly recommends it as a specific in nervous and sick headache. By a chemical analysis, Dr. J. E. Young found in the seeds a volatile oil, a principle supposed to be identical with *conia*, etc. (Am. J. Pharm. xxvii, 294), U. S. Disp. 12th Ed.

CELERY, (*Apium graveolens*). Ex. cult. Milne, Ind. Bot. 420. The fresh roots, observes Dr. Lewis, when produced in their native water soil, are supposed to partake of the ill quality of those of the hemlock kind, and to be particularly hurtful to epileptic and pregnant women. So that we have here a striking evidence of the excellence of the Natural System, as it may be remembered that, in describing the characteristics of this order, this plant was alluded to as forming an exception.

PARSLEY, (*Apium petroselinum*). Ex. cult. Leaves aromatic and slightly diuretic, and used as such. A recent Journal contains the following: Two physicians of Paris have published a very important memoir, the object of which is to make known the immense resources which the healing art may draw from the seed of the Parsley. This common indigenious plant possesses incontestible febrifuge properties; the decoction of its seeds may be substituted for that of Cinchona, and the active principal which has been drawn from it, and which they designate under the name of Apiol, is equivalent to Quinine in the treatment of local intermittent fevers.

The U. S. Disp. 12th Ed. refers to the substances apiin and apiol furnished by the seeds and root of this plant, and also states that the juice of the fresh herb has been employed as a substitute for quinine—and the seeds also, according to M. M. Jozet and

Homolle, yield apiol and act on the system very much like quinine, producing in the dose of about 15 grains cerebral excitation, and in increased doses causing a species of intoxication with giddiness, wasted sights and sounds, etc. In temperate latitudes it cured intermittents in the proportion of 86 per cent. It has also been employed as an emmenagogue in dose of four grains morning and evening. (Journ. de Pharm. June, 1861.) It is sometimes given in capsules of gelatin.

BISHOP'S WEED, } *Discopleura capillacea*, D. C. and T. and Gray. *Ammi majus* of Walter.
Grows in damp soils. Fl. July. N. C. Shec. Flora Carol. 136.

WATER PARSNIP, } *Sium nodiflorum*, Walt. and Ell. Sk. *Helosciadium* of Koch.
"Probably introduced; abundant around Charleston." Ell.

Thornton's Fam. Herbal, 297; Ray's Cat. Plantarum, 213; Dict. de M. Méd. It is recommended in cutaneous eruptions. Withering relates the case of a young lady, who was cured of a very obstinate attack by taking three large spoonfuls of the juice twice a day; "and I have repeatedly seen," says Thornton, "two ounces administered every morning with the greatest advantage." It is not nauseous, and children take it readily, mixed with milk. When it is prepared in this way it is not disagreeable, and does not affect the head, stomach, or bowels. U. S. Disp. 1296. The juice has also been employed in scrofulous swellings of the lymphatic glands, and is considered diuretic. Mér. and de L. Dict. 369; Bull. des Sc. M. de Férus. xviii, 420 and xx, 421.

FENNEL, (*Fœniculum officinale*). Introduced from Europe; cultivated.

The seeds of Fennel are well known; employed in flatulent colic for their carminitive and stimulant properties. The oil of fennel is also used for the same purpose, and to correct the taste of medicine. See authors.

COW PARSNIP; MASTERWORT, (*Heracleum lanatum*, Mx.) Mountains of North Carolina.

This is an acrid plant, much esteemed by the Indians. Bigelow, Mat. Med. 203, is of the opinion that it is poisonous, and should be used cautiously when gathered from wet places. The root and leaves have an unpleasant and rank odour, and

the taste is pungent and acrid. Its qualities are certainly active. Griffith. The root, in a dried state, is used as a diuretic expectorant and antispasmodic. It has been greatly employed by Empyrics. Dr. Griffith quotes a paper by Dr. Orne, of Salem, Mass., read to the Massachusetts Medical Society, 1803, in which he reports three out of five cases of epilepsy cured by it. He gave it in large doses both in substance, and in infusion. Dr. Cox, Am. Disp. 326, recommends it as a stomachic and carminative, and in cases of dyspepsia accompanied with flatulence and cardialgia, he used a strong decoction of it with benefit. The leaves are used externally as rubefacients as a cataplasm in abscesses, and the seeds are said to be expectorant. Dr. Richardson, Faun. Bor. Am., says the Northern Indians use a portion of the hollow stem of this plant to imitate the voice of the male deer, to attract the female within gunshot. Griffith.

ANGELICA ; MASTERWORT, } *Angelica lucida*, Ell. Sk. *Archangelica* of some.

I have collected it in rich woods in Fairfield district; also rarely in upper St. John's, Charleston district. Fl. July.

Pe. Mat. Med. and Therap. ii, 469; Ed. and Vav. Mat. Méd. 276; Le. M. Med. i, 85; Woodv. Med. Bot. 86; U. S. Disp. 98; Journal de Pharm. 3e sér. 2; Mér. and de L. Dict. de M. Méd. i, 296; Shec. Flora Carol. 167. The root is edible, and possesses more aroma than any of our indigenous plants. It is used in spasmodic vomiting, flatulent colics, and nervous headaches; some say it is powerfully emmenagogue. The vittæ of some species are filled with a pungent oil. A candy is sometimes prepared with the roots boiled in sugar. The great fragrance of this root has caused it to be used for many purposes by the confectioner and others; the tender stalks also are candied. The seeds are cordial, tonic, and carminitive; and the plant was in repute at one time as a preventive of pestilence to those who bore it about them. "The pulverized root, in doses of a drachm, is said to be very useful in pestilential fevers and diseases of the liver; and a paste of its root and vinegar used to be carried and smelled at by physicians during the prevalence of epidemics, as a preventive of infection." Wilson's Rural Cyc. "Angelica" is stated in some tables to yield more potash even than wormwood or fumitory. See "*Chenopodium*" and "*Fumaria*" in this volume. Chapman does not include the *A. lucida*

in his Flora—he has *Archangelica hirsuta*, T. and G. A. *triquinata*, Ell. N. C. Drs. Wood and Griffith refer to *Angelica atropurpurea* as a native of the South, and Dr. Griffith includes *A. lucida*, also, as a highly aromatic plant.

DILL, (*Anethum fœniculum*, L.) Introd. cult. in South Carolina.

It is employed in flatulent colic as a carminative and antispasmodic. The oil has been given in hiccough. Milne, in his Ind. Bot. 404, says: The herb, boiled in broth, has been used with great success in preventing obesity." See authors.

CARROT, (*Daucus carota*, Tourn.) Completely naturalized, says Elliott, in South Carolina, Georgia and North Carolina. Collected in St. John's; Charleston. Fl. April.

Woodv. Med. Bot.; Royle, Mat. Med., 401. The root and seeds are stimulant, carminative, and eminently diuretic; employed with great success in strangury, anasarcous swellings of lower extremities, in suppression of urine, and in painful micturition. Eberle on Diseases of Children, 110; Am. Herbal, 92; Frost's Elems. Mat. Med. 298. Dr. Chapman used a strong infusion in gravel. Mér. and de L. Dict. de M. Méd. 299; Flora Méd. ii, 99; see Chemical Anal. by Bouillon Lagrange, in the Journal de Pharm. i, 529. Britanet and himself wrote a book on the plant (which may be seen in the New York Hosp. Lib.) The root contains some volatile oil, a large proportion of pectin, a peculiar coloring principle called *carotin*, and sugar. Griffith, Med. Bot. 337. The authors alluded to above contend that the plant acts as a sedative, even topically applied. In the form of a poultice, it calms pain, is antiseptic, and corrects the intolerable fetor arising from internal diseases—as of the ear, for example. Dr. Geo. Wilkes, ophthalmic Surgeon, New York, informs me that he finds it invaluable in this respect. Mém. de Muséum, iv, 102; Suppl. to Mér. and de L. 1846; Vauquelin upon the Pectic Acid in the Root of the Carrot, Journal de Pharm. xv, 340. The essential oil is regarded as emmenagogue and anti-hysteric. Ancien Journal de Méd. xxiv, 68. In Germany, it is considered vermifuge. Crantz, Mat. Med. i, 23. Shecut, in his Flora Carol., alludes to its employment in gravel, and in expelling a species of tape worm. A syrup similar to treacle has been obtained from it, and by distillation, a liquor nearly equal in

flavor to brandy. An old Encyclopœdia, in a very favorable notice of the carrot, then not so generally known, gives this statement:

"Various but unsuccessful attempts have been made to get sugar from carrots—they yielded only a thick syrup similar to treacle. These roots have been lately employed more advantageously in distillation. A distiller has obtained from ten pounds of carrots, one quart of 'first runnings' and half a pint of very strong ardent spirits."

Much use is made of the seeds of this plant in popular practice as a diuretic. For this purpose a drachm of the bruised seeds, which are excitant and carminative, may be taken at once, or an infusion of an ounce of the seeds may be given during the day. Prof. Proctor has made an ointment of the root grated and mixed with lard and wax melted, and slightly evaporated and then strained. It is used in excoriated or ulcerated surfaces requiring a gentle stimulation. U. S. Disp., 12th Edition.

WILD CARROT, (*Daucus pusillus*, Mx.) Grows on the Savannah River; collected in St. John's; Charleston. Bach., N C.

Eberle, Mat. Med. and Therap. ii, 318; Bell's Pract. Dict. 162. The seeds contain more volatile oil than the other species. It, however, possesses nearly the same properties. Used as a diuretic in calculous diseases, suppression of urine, etc.

ARALIACEÆ. (*The Aralia Tribe.*)

GINSENG, (*Panax quinquefolium*, L.) Rich soils in the mountains of South Carolina and Virginia, and westward. Fl. May.

Am. Herbal, 157, by Stearns. In China they drink an infusion of the root instead of tea, and it is well known that they have recourse to it as a last resort in all diseases; Dr. James says, more especially in all cachectic and consumptive cases, and in those arising from debility of any kind. Dr. Healde also alludes to their great confidence in it as a restorative after great fatigue, as an anti-spasmodic in nervous affections, in coma, and as an aphrodisiac; one hundred and twenty grains of the sliced root are boiled in a quart of water, and two ounces of the decoction, or twenty grains of the root in substance, is employed. Jartoux, in the Phil. Trans. xxviii, 239, states that, after being fatigued by travelling three days, he employed the

decoction of the leaves internally, and as an application to the feet, and was satisfied of its utility, being completely revived by it. Dr. Wood, in the U. S. Disp. 530, says, it is very little more than a demulcent; but Lindley, Nat. Syst. Bot. 25, thinks that there is no reasonable doubt of the ginseng having an invigorating and stimulant power, when fresh. Big. Am. Med. Bot. ii, 82; Mér. and de L. Dict. de M. Méd. iii, 356, and iv, 176; Flor. Méd. iv, 185; Kaempher, Amoen. Academicæ, v, 218; Histoire du Japon, vi, 218; Burmann, Flo. Ind. tab. 29, i; L'Encyclop. Chinoise, lxcii; Flora Cochine, 806; Lafitteau, Descrip. du Ginseng, Paris, 1718, i, 12. Dr. Sarrazin introduced it into notice in Europe. Trans. Roy. Acad. Sci., Bartram Com. 61, 1741; J. P. Bregnius, Diss. Med. de Radice Ginseng, 1700; Coxe, Am. Disp. 434. Cullen in his Mat. Med. 270, refers to its efficacy in increasing virility. See Merat, loc. cit. "J'avoue qu'un individu qui en avait fait usage dans cet dernière intention pendant long temps, n'en obtint absolument aucun résultat." S. Vaillant in Acad. des Sci. 1718; Bourdelin, Hist. de l'Acad. 1797; Lafitteau, Mem. concernant la précieuse plante de Ginseng, Paris, 1788; Kalm. Travels, iii, 114; Osbeck's China, 145; Heberden, Med. Trans. iii, 34; Fothergill, Gent. Mag. xxiv, 209; loc. cit. sup. The Ginseng was an article of importance as an export from Virginia. The root is thought to resemble liquorice, and may partially supply the place of that article: see Report from Surgeon-General's office, C. S. A., 1862.

THREE LEAVED GINSENG, (*Panax trifolium* L.) N. C. Croom.

This formed an article of considerable trade formerly with the Indians, and it makes an excellent cordial. Mills' Statistics of South Carolina.

LIQUORICE, (*Glycyrrhiza glabra.*) Exotic. I am uncertain as to the position of this genus in the Natural system; it should probably be placed near "Robinia." Dr. Wood states, U. S. Disp., that a species G. *lepidota* grows about St. Louis and along the bank of the Missouri to its source. A friend informs me that it has been a long time planted near Doko, on the Charlotte Railroad, in South Carolina, where it grows luxuriantly. This plant is said to be well adapted to the Southern States. It has been grown in Texas. Information as to the best mode of planting and culture can be found in a paper in Patent Office

Rep. 1854, p. 359. I append the following practical remarks: "The sooner liquorice is sold the heavier it weighs; and the greener it is the more virtue it contains. It is sold in three distinct forms, viz: in the roots, in powder, and in its inspissated juice. The first of these needs no explanation. The second is prepared by cutting the small roots into small pieces, drying them in an oven or kiln, and grinding them in a mill. The third kind is prepared by pounding the smaller roots and fragments with cold water for nearly two days; after which the pulp is to be squeezed, and the juice boiled down in an iron pot to a pitchy consistence, and then rolled or stamped into sticks or cakes, which are sometimes sold under the name of 'Spanish Liquorice.' Liquorice roots will keep a year if laid in sand, and stored in a cool, dry cellar; and if the sets, or runners, or buds, are cut ready for planting, tied in bundles, and sent by land carriage, they will keep a fortnight. If packed in sand, and sent by water, they will keep some three or four months, especially the more hardy buds." In the Patent Office Reports for 1854–'55, the cultivation of a number of medical plants is described, particularly those yielding aromatic oils.

TOOTHACHE BUSH; ANGELICA TREE; PRICKLY ASH; PRICKLY ELDER, (*Aralia spinosa*, L.) Collected in St. John's; rich soils along fences; Charleston, Florida and North Carolina.

Plant often confounded with the *Xanthoxylon;* properties somewhat similar. See *X. fraxineum*, which is the true Prickly Ash. Ell. Bot. 373; Mér. and de L. Dict. de M. Méd. i, 379; Coxe, Am. Disp. 100; Shec. Elora Carol. 191; Frost's Elems. 20; Griffith, Med. Bot. 345. It is a stimulating and very certain diaphoretic, "probably to be preferred to any emetic yet discovered among our native plants." This species is more stimulating than the *A. nudicaulis*. The infusion of the bark of the root is used in chronic rheumatism and cutaneous eruptions, also employed in lues venerea. Pursh states that a vinous or spirituous infusion of the berries is remarkable for their power in relieving rheumatic pains, and the tincture is also given in Virginia in violent colics. See Dr. Meara's experiments. Mérat says, it has been used to allay pain caused by carious teeth. Dose, of the saturated tincture, a tablespoonful three times a day. A decoction is often preferred in rheumatism,

made by boiling an ounce of the bark in a quart of water; taken in divided doses several times a day. In South Carolina, this plant is the rattlesnake's master *par excellence*, according to the negroes; they rely on it almost exclusively as a remedy for the bite of serpents. I am informed that they use the bark of the fresh root in substance, taken internally, also applying it powdered to the wounded part. Dr. Meara advises that the watery infusion, when employed as a diaphoretic, should be made very weak, as it is apt to excite nausea, and cause irritation of the salivary glands.

SPIKENARD, (*Aralia racemosa*, L. Mx.) Grows, according to Dr. McBride, in the mountains of South Carolina, Georgia and North Carolina.

Ell. Bot. Med., note, i, 373. The decoction of the root is much esteemed by those residing in the mountainous districts as a remedy in rheumatism; no doubt possessed of stimulating properties. Michaux cites it as a sudorific. The root, when boiled, yields a gummy substance. A tea, syrup, or tincture, may be made of the roots or berries. It is given in coughs, asthma and diseases of the lungs. Also given as a stimulant in menstrual obstructions; said to be in high repute among the Indians. See the "Indian Guide to Health." Dr. Sarazzin informs us that it is very useful as a cataplasm in inveterate ulcers; generally adapted to similar purposes with the *A. nudicaulis*. Mér. and de L. Dict. de M. Méd. i, 376; U. S. Disp.; Am. Journal Med. Sci. xix, 117.

WILD SARSAPARILLA; WILD LIQUORICE, (*Aralia nudicaulis*, Mx.) Mountains of South and North Carolina. Fl. June.

Raf. Med. Flora, i, 53; U. S. Disp. 116. A gently stimulating diaphoretic; thought to be alterative, and used in popular practice in rheumatism, syphilis, and cutaneous affections. Mér. and de L. Dict. de M. Méd. i, 375. Dr. Meara records the roots as possessing the virtues of sarsaparilla. Mus. Med. Philos. iv. An excitant diaphoretic, and eutrophic, like mezereon, guaiac, sarsaparilla, and sassafras. The infusion has been employed with success in zona, and as a tonic in debility of stomach (*les relâchemens d'estomac.*) Coxe, U. S. Disp. 99; Lindley's Nat. Syst.; Griffith Med. Bot. 344; Phil. Med. Mus. ii, 161. Administered in domes-

tic practice, in pulmonary disease, where inflammation does not coexist.

DWARF ELDER, (*Aralia hispida*, Mx.) Mountains of North Carolina and northward.

Dr. Peck strongly recommends the root as a diuretic in dropsy. He uses it in the form of decoction and finds it pleasanter to the taste and more acceptable to the stomach than most other medicines of the same class. Am. J. Med. S. C. xix, 117; U. S. Disp., 12th Edition.

BERBERACEÆ. (*The Berberry Tribe.*)

AMERICAN BARBERRY, (*Berberis valgaris*, Walt. Fl. Carol. *Berberis Canadensis*, Ph. and Ell.) Grows wild in St. John's, Berkeley, near Woodlawn, Pl.; upper districts of Georgia, South and North Carolina, and northward. Fl. May.

Shec. Flora Carol. (see *B. vulgaris*,) 268; Lind. Nat. Syst. Bot. 30; U. S. Disp. 1233, Appendix. The *B. vulgaris* of Europe, with which this plant is not identical, though differing from it but slightly, if at all, in medicinal properties, has received considerable attention. They are used as a domestic remedy in jaundice, and in dysentery and diarrhœa; it is supposed that the acid is specific. From analysis by Buchner and Herberger, it is shown that the root contains a new principle called *berberine*, which acts like rhubarb, and with equal promptness and activity. Griffith, Med. Bot. 113; Journal de Pharm. 1233; Trans. Phil. Soc. 1834; Analysis in Journal de Pharm. xxiv, 39; Mér. and de L. Dict. de M. Méd. Supplement, 1846, 101. From the berries a syrup is obtained which is adapted to putrid fevers, and those of a low type; a cooling drink is also made with them, and given in similar cases. The root boiled in lye imparts a yellow color to wool. I have observed the remarkable irritability of the stamens in the species growing in South Carolina, which, when touched, instantly spring down upon the stigma, and in this way communicate their pollen to it. It was said to have a singular effect upon wheat growing near it, turning the ears black for some distance around; but this, however, is doubted. The berries are acid. The English barberry (*B. vulgaris*) has attracted much attention; its fruit is edible, and much discussion has been excited whether or not it produces smut in wheat or corn when planted near it. Experiments touching this peculiarity should

be performed with respect to our barberry. For a full statement of the merits of the above question, see Wilson's Rural Cyc. Art Barberry. Thaër, in his "Principles of Agriculture," p. 409, says: "One very extraordinary fact is that the barberry bush will produce smut, or something very similar to it, in all corn growing within a considerable distance of it. This is a fact which has been confirmed by numerous observations and experiments in almost all countries. But it has never yet been clearly and satisfactorily ascertained in what manner the barberry produces this effect. My friend Einhoff has made several experiments on the possibility of communicating the *æcidium* (a parasitical fungus) to cereals by cutting branches from the barberry, which were quite covered with it, and shaking them over the corn, or else planting them in the midst of it; but he never succeeded in thus producing the disease; therefore it would seem that it is not the communication of this dust, but the vegetation of the barberry in the vicinity of the cornfield, which engenders the disease. Nor will it attack crops planted near young and newly made barberry hedges; but as these latter grow up, the disease will appear until these hedges are rooted up. As soon as the barberry has been thoroughly extirpated, the evil disappears." Thaër considers mill or mel-dew a disease of the skin of plants. See this work for information on diseases affecting the cereals—on irrigation, etc. Translated by William Shaw and C. W. Johnson, New York, 1852. It is believed by some in this country that the pokeweed (*Phytolacca*,) if allowed to die in a cotton field, will produce rust. This is quite unlikely.

Dr. Wood advises that the active principle *berberina* be examined for its antiperiodic properties. See Hydrastis, in this volume; U. S. Disp., 12th Ed.

BLUE COHOSH; PAPOOSE ROOT; SQUAW ROOT, (*Caulophyllum thalictroides*, Mx., *Leontice thalictroides*, L.) Mountains of South Carolina and northward. Ell.

The seeds when roasted are said to form an excellent substitute for coffee. The root, which is the part used, is sweetish, somewhat pungent and aromatic, affording a yellow infusion or tincture. See Griffith, who says that it is much employed by empyrics, who derived a knowledge of it from the Indian. "It is stated to be demulcent, antispasmodic and emmenagogue,

and has been administered in rheumatism, dropsy, nervous disorders," etc. Rafinesque states, adds Griffith, that it is particularly adapted for female disorders, and that the Indian women make use of a tea of the root for some time before their confinement, asserting that it facilites parturition. It is likewise said to be an active emmenagogue. Ryddell, Synop. 4, also states that it is "bitter, diuretic and a preparatory parturient." Griffith invites an examination of it. A decoction, infusion or tincture of the root is employed; of the two former the proportions are an ounce to a pint of water—dose one or two ounces; the dose of the tincture, made by adding four ounces of the root to a pint of spirits, being one or two teaspoonfuls.

SARRACENIACEÆ.

The species of this order are exclusively confined to the bogs of this country. Lindley thinks it should also comprehend the Dionæa, which grows in North and South Carolina, and which also possesses the power of entrapping insects. See *D. muscipula.*

FLY-CATCHERS; SIDE-SADDLE FLOWERS, (*Sarracenia flava*, L., and *variolaris*, M.) Diffused; grow in bogs; Charleston; Newbern. Fl. June.

See Mér and de L. Dict. de M. Méd. vi, 226, where the Diss. of Dr. McBride, of South Carolina, in the 12th vol. Trans. Linnæan Soc., is referred to. I have read this description of one of our native botanists, and allude to it with pleasure. I am informed by several gentlemen of South Carolina, that these plants are used in dyspepsia with great service. The roots are undoubtedly possessed of bitter, tonic and stomachic properties; and I am credibly assured of a number of cases in which relief has been experienced from them. The taste is disagreeable to those using them for the first time, but eventually it becomes pleasant, as I have myself experienced. An infusion might serve as a useful substitute for bitters.

In an article on the medicinal and chemical properties of these plants, published by me in the January number (1849) of the Charleston Medical Journal, the attention of the profession is for the first time invited to their reputed value in the treatment of dyspepsia. Several cases are there detailed, illustrat-

ing the employment of the Sarracenia. It is supposed by many to relieve most of the distressing symptoms of this affection, among which may be cited: gastralgia, pyrosis, acidity, and the general feeling of malaise so frequently attendant upon it. In some it induces considerable diuresis, and in others soreness of the mouth. In experiments made upon my own person, to ascertain its physiological effects upon a healthy individual, it exhibited a tonic, stimulating influence upon the digestive organs, producing some cerebral disturbance, when persisted in. On one occasion three hundred and twenty grains of the dried root, in the form of pills, were taken during the course of twelve hours. From the examination made for me by Prof. C. U. Shepard, it contains besides lignin, coloring matter, and traces of a resinous body, an acid, or an acid salt, and also an astringent property, due neither to tannic nor gallic acid, "and a salt of some alkaloid, related perhaps to cinchona, which, should it prove new, may be called *sarracenin.*" I ascertained the existence of starch in some quantity in the cold infusion and in the decoction, not discovered in the boiled alcoholic solution, which, however, contained some gluten. "In its exhibiting in moderate quantities no very decided nor violent effects upon the animal economy in disease consists its excellence. And its peculiar action on the stomach, I think, is the result of a happy combination of elements, which renders it appropriate to the relief of an affection like dyspepsia. Its acid prevents or corrects the undue formation of alkalies, or supplies its own deficiency; the existence of either condition having been assumed as explaining the true pathology of the disease. Its power of neutralizing or correcting acidity was obvious. Its bitter property, which is abundant, is tonic and restorative; its resinous portion may supply the proper cathartic stimulus, the too inordinate action of which is corrected by the astringent; and this being neither that of the tannic nor gallic acid found in other vegetable tonics, may be superior. Should dyspepsia be a gastric neuralgia, or consist, as Parry thinks, in a condition of hyperæmia; or as, according to Wilson Philip, a chronic gastritis, its relief may be accounted for, by a narcotic principle contained in the plant; the cerebral disturbance, one of its physiological effects upon my own person, giving some color to the suggestion." (See

Art. *cit. sup.*) A bit of the fresh or dried root of either species may be chewed, and the juice swallowed during the day before each meal; it may be given powdered in the form of pill, with a little rhubarb if necessary; or a tincture may be made by pouring a pint of brandy over several ounces of the root, of which half an ounce, diluted, may be taken three times a day. I have lately had cases reported to me of its marked success in the relief of chronic diarrhœa and dysentery, and I am pleased to learn that it is now widely used in other portions of South Carolina and in Georgia, with very general approbation.

PITCHER PLANT, (*Sarracenia purpurea.*) I have specimens from Barhamville, S. C., and have collected it in St. John's, S. C., near the State Road. It is not near so common as the other species. N. C. Curt. Cat.

The following paper was sent to the Surg. General C. S. Army, and was addressed to the Editor of the "Evening Mail," Eng., by Cosmo G. Logie, Surg. Major Royal Home Guards (Blue,) and dated Windsor, May 25, (1862:)

Some time ago, seeing a paper written by Assistant Surgeon Miles, of the Royal Artillery, on the efficacy of the North American plant called the *Sarracenia purpurea*, or pitcher plant, in the treatment of small-pox among the Indians, my colleague (Mr. Agnis) and myself have given this remedy, which has been imported into this country by Dr. Miles, to the house of Messrs. Savoy & Moore, a fair trial. And I am happy to say the eleven cases in our hands have recovered under its peculiar influence. This remedy I consider a boon to the public, for this reason: it is so easily managed; any one can make a decoction or infusion of the root, like tea. An ounce of the root is sliced and infused in a quart of water and allowed to simmer down to a pint, and given in two tablespoonful doses every four hours, while the patient is well nourished with beef tea and arrow root. Four of the cases in my hospital have been severe confluent cases, (confluent means where the head, face and neck are swollen into a misshapen mass, and the pustules thickly running into each other;) they have throughout the disease all been perfectly sensible, have had excellent appetites, been free from pain, and have never felt weak. The effects of this medicine, which I have carefully watched, seemed to arrest the

development of the pustules, killing, as it were, the virus from within, thereby changing the character of the disease, and doing away with the cause of pitting (if I may so express myself to the uninitiated,) and thus avoiding the necessity of gutta percha and India rubber application, or of opening the pustules. In my opinion, all the anticipations of disfigurement from pitting may now be calmed, if this medicine is given from the commencement of the disease. Before leaving this subject I may here caution the public that the useful part of the plant is its root, as recommended by Dr. Miles, and it can only be obtained from Messrs. Savoy & Moore, to whose house alone it has been imported. With the usual kindness of Dr. Gibson, the Director-General, I have been amply supplied with it for the use of my regiment. So much am I impressed with the efficacy of it in small-pox over the old mode of treatment, that I hope to hear of it in every country gentleman's medicine chest."

It is difficult to conceive how it acquired any reputation in the cure of small-pox, unless from the fact that simple means are the best in the treatment of this disease, as in other eruptive fevers. I do not know that the *S. purpurea* has ever been experimented with in this country. I was unable to procure any of it in Virginia, in obedience to the wishes of Surgeon-General Moore. Dr. A. Raoul informs me that this plant has been used in South Carolina to correct vomiting in pregnant women, 1867. He has employed it for this purpose. Prof. Wood, in 12th Ed. U. S. Disp., is inclined to put no confidence in the power of this plant as a remedy in small-pox, and I fully agree with him. He refers to a description of this species in all its relations by Prof. Bentley, in a paper in the Pharm. Journ. for January, 1863.

RHIZOPHORACEÆ. (*Mangrove Tribe.*)

MANGROVE, (*Rhizophora mangle*, L.) This plant is found in South Florida. Chapman. An introduced species is used in India for yielding a black dye.

ONAGRACEÆ. (*The Evening Primrose Tribe.*)

SCABISH, (*Œnothera biennis*, Linn.) Grows in dry pastures; diffused; collected in Charleston District; Newbern.

Journal Phil. Coll. Pharm. iv, 202; Lind. Nat. Syst. Bot. 36; U. S. Disp. 1281; Dém. Élém. de Bot. ii, 444; Griffith, Med. Bot. 304. The root and herb have been employed in cutaneous diseases. Dr. Griffith has used it with success in tetter, applying the decoction to the affected part several times a day, and giving it internally at the same time. He has been successful with it in subsequent trials. The plant should be gathered about the flowering season. The young sprigs are mucilaginous, and can be eaten as salad. Lindley. The leaves of the Œnothera expand in the evening, and continue open all night. Pursh states that, even of a dark night, it can be seen at some distance, owing, he supposes, to some phosphoric property. The leaves are stated by M. Dussauce, in his Treatise on Tanning, Philada., 1867, to be useful in tanning leather. Its roots have a nutty flavor, somewhat similar to those of rampion, and are used in Germany and some parts of France, stewed and raw, in salads, with mustard, oil, salt and pepper, like the common celery The ancients thought the plant possessed the power of allaying intoxication and calming the most ferocious animals. It is doubtful whether this is the Œnothera of the ancients. Wilson's Rural Cyc. It appears to possess some power as an abstergent, and is used in washing clothes.

WILLOW-HERB, (*Epilobium augustifolium*, T.) Mountains of N. C. and northward. The leaves and root are said to be demulcent, tonic and astringent, and yield their virtues to alcohol. They are used by the "Eclectics," adds Dr. Wood, generally and locally, in decoction infusion or cataplasm, in cases which call for the use of astringent remedies; U. S. Disp., 12th Ed.

Jussiœa grandiflora, Mich. Grows in bogs; "common around Savannah, and in ponds four miles from Charleston."

Dr. J. Bachman informs me that he has seen it in abundance around Charleston for the space of ten miles, from which locality I have specimens. Fl. July. Dr. S. A. Cartwright, of Natchez, asserts that this plant has the power of preventing the development of malaria in regions peculiarly adapted to its generation. He affirms that it "purifies all stagnant water in which it grows—that of the lakes and bayous inhabited by it being as pure to the sight, taste and smell as if it had just fallen from the clouds"—ascribing to the presence and peculiar

"hygienic or health-preserving properties of this plant" the remarkable exemption of the inhabitants of lower Louisiana from "malarious or miasmatic diseases." "The fact," he adds, "that the region of country in which this aquatic plant abounds is exceedingly healthy, can be established beyond cavil or dispute; it nevertheless contains more stagnant water and swamps than any other inhabited district of the same extent in the United States." He is quoted in the notes appended by the American editor, to Watson's Pract. Physic, p. 465; and Dr. Wood, in his late work on the Practice of Physic, also makes use of these assertions as if they were established. Dr. C. must seek for the exemption of this section of country from these diseases in other causes, as this plant is abundant around the cities alluded to above, in situations where it is well known that fevers of malarious origin are continually prevailing. I have recently observed this plant growing profusely around Charleston Neck, where intermittent and remittent fevers are notoriously prevalent.

The genus Jussiæa has its *roots* distended into vegetable swimming bladders. The curious can examine the *J. grandiflora* to observe this peculiarity, like that in our beautiful *Utricularia inflata*. *Typha and Nymphæa* (water lily,) and *Sagittaria*, also "display myriads of air chambers in the solid stem." See Wilson, "Aquatic plants."

BASTARD LOOSESTRIFE; SEED BOX, (*Ludwigia alternifolia*, L.) Grows in Charleston District; Elliott says rare; seven miles from Beaufort, and at Savannah; collected in St. John's; North Carolina. Fl. Aug.

Mérat, in the Dict. de M. Méd. iv, 154, says that in America a decoction of the root is employed as an unfailing emetic.

MELASTOMACEÆ.

In this order, a slight degree of astringency is the prevailing characteristic; though a large one, it does not contain a single unwholesome species.

DEER GRASS; SORREL, (*Rhexia glabella*, Mx.) Grows in moist pine lands, vicinity of Charleston; collected in St. John's; North Carolina. Fl. July.

The leaves of this plant have a sweetish, acid taste, and are eaten with impunity. Deer are said to be fond of them.

MYRTACEÆ. (*The Myrtle Tribe.*)

POMEGRANATE, (*Punica granatum.*) Cultivated with success in the Southern States. The bark of the root is a well known astringent; employed in dysentery and diarrhœa; one scruple of the powder may be given at a dose, or a decoction may be used if this is too strong, as it acts on the nervous system. Carson, in his Illust. Med. Bot. i, 1847, states that it has also been employed with success against tænia. The fruit is remarkable for the beauty of the coloration of the pulp around the seed vessels, which are packed away in a surprisingly economical manner. This is edible, and forms with water a cooling ascescent drink, grateful in fevers. A correspondent of the "Mercury," "F. J. S.," 1862, says that the rind of the fruit yields a jet black fluid, which writes very smoothly and retains its jetty hue."

LYTHRACEÆ. (*Loosestrife Family.*)

SWAMP LOOSESTRIFE, (*Nesæa verticillata*, H. B. H. *Decodon verticillatum*, Ell.) N. C.

Lindley tells us : "It is said to destroy the young of cattle heavy with calf." Dr. Tully says: "If a great amount of testimony will decide anything in medicine, *Decodon v.* is an ecbolic for certain brute animals. This effect is said to be most frequently produced upon ewes, next upon cows, and sometimes upon mares."

HAMAMELACEÆ. (*The Witch-Hazel Tribe.*)

This order, remarks Lindley, is found in the northern parts of North America, Japan and China. In my examination of the various authorities on the subject before me, I have frequently been struck with the correspondence prevailing between the species found in South Carolina and those of Japan, and this respects only the medical botany of the two; should the flora of each be compared, a still more universal relation might be established. Professor Agassiz has noticed something of the same kind existing between the fossil botany and the fauna of each.

WITCH-HAZEL, (*Hamamelis Virginica*, L.) Grows along pine land bays; collected in St. John's, Charleston District; vicinity of Charleston, Bach.; N. C.

Mér. and de L. Dict. de M. Méd. iii, 452; Coxe, Am. Disp. 310; U. S. Disp. 1258; Matson's Veg. Pract. 201; Griffith's Med. Bot. 350; Rafinesque, Med. Flor. i, 227. It is said to be sedative, astringent, tonic and discutient. The bark was a remedy derived from the Indians, who applied it to painful tumors, using the decoction as a wash in inflammatory swellings, painful hemorrhoidal affections and ophthalmias. A cataplasm, and a tea of the leaves, as an astringent, were employed in hæmatemesis. The steam practitioners also administer it in irritable hemorrhoids, and during the bearing-down pains attending child-birth. No analysis has been made, but as it probably contains sedative and astringent principles, attention is directed to it. The curious reader may consult, besides the paper in Hutton's "Mathematics," on the wonderful properties of the witch-hazel in detecting water, a recent one in Patent Office Report on Agriculture, p. 16, 1851. This is from Prarié du Chien, by Mr. Alfred Burnson, and contains some remarkable statements of the certainty of finding water by divining rods. Some electrical and telluric influences are hinted at—*Credat Judæus!* Persons living in the upper districts of South Carolina assume to use the rod with success.

Dr. James Fountain, of Peekskill, N. Y., speaks highly of the efficacy of the bark in hemorrhage of the lungs and stomach, and also as one of the best applications for external piles, an ointment being prepared from lard, and a decoction of equal parts of this bark, white oak bark and that of the apple tree. He believes the witch-hazel to possess anodyne properties. (N. Y. J. Med. x, 208.) Dr. N. S. Davis in his report (Trans. Am. Med. Assoc. i, 350,) agrees with Dr. Fountain in his estimate of this remedy, which he has employed in the form of a decoction, made with one ounce to a pint of water; dose, a wine glass full every three to eight hours in incipient phthisis. U. S. Disp., 12th Ed.

In the Richmond Journal for January, 1868, is an article from the Atlanta Med. and Surg. Journ. (1867,) in which Dr. W. W. Durham claims for this plant properties similar to those said by Dr. Phares to be those of the *Virburnum prunifolium*, and which tend to confirm opinions expressed above by Prof. Davis and others. In reference to its power of preventing abortion or miscarriage, Dr. Durham says: "At one period of my practice

the negroes used the cotton root so frequently to produce abortion, that my supply of black haw became exhausted, and having heard of this power of the hazel to affect the purpose for which I used the haw, I resorted to it (the hazel) with perfect success. Having only used it for the purpose of preventing abortion, from the effects of the cotton root, I cannot speak of it in other cases." He makes a decoction of one pint of the leaves to one pint of water, which is administered freely. See also *Viburnum prunifolium.*

Dr. Joseph Bates, in an article on the Witch-hazel, published in Tilden's "Journ. of Mat. Med," February, 1868, furnishes an analysis of this plant by Dr. A. Lee. (See J. of Mat. Med. 2, p. 200.) The bark contains organic and inorganic matter, allumen gum, extractive, tannin, a particular (bitter) principle, resin, starch, etc.

Dr. Lee observes: "The great amount of tannin contained in this plant is worthy of notice; while the sumach contains three hundred and twenty-five and geranium one hundred and thirty-six parts in seven thousand, the hazel contains no less than four hundred." This is an important statement and deserves attention. In the Boston Med. J. Surg. J., v, 37, p. 348, is an account of the efficacy of this plant in arresting hemorrhages—the leaves being chewed and the juice swallowed. Tilden & Co. prepare a fluid extract which may be given in doses of one to two drachms. By means of this an infusion or a wash may be made by mixing with water in the proportion of one ounce to a pint.

CORNACEÆ. (*The Dogwood Tribe.*)

DOGWOOD, (*Cornus Florida*, L.) Well known; diffused in rich, shady lands; Newbern; Va.

Drayton's View S. C. 63; Bell's Pract. Dict. 152; Barton's Collec. 12; Eberle, Mat. Med. 303; Chap. Therap. and Mat. Med. ii, 438; Ell. Bot. i, 208; Pe. Mat. Med. ii, 753; U. S. Disp. 277; Ed. and Vav. Mat. Méd. 197; Am. Journal Pharm. vii, 114; Royle, Mat. Med. 422; Ball. and Gar. 310; Mér. and de L. Dict. de M. Méd. iv, 436; Big. Am. Med. Bot. ii, 73; Shec. Flora Carol. 449; Thacher's Disp. 203; Walker's Inaug. Diss. Phil. 1803; Lind. Nat. Syst. Bot. 49; Frost's Elems. Mat. Med. This well known plant possesses tonic and anti-intermittent

properties, very nearly allied to those of cinchona; in periodic fevers, one of the most valuable of our indigenous plants. "Dr. Gregg states that, after employing it for twenty-three years in the treatment of intermittent fevers, he was satisfied that it was not inferior to Peruvian bark." Generally given in conjunction with laudanum. It also possesses antiseptic powers. In the recent state, it is less stimulating than the cinchona bark, but it affects the bowels more; the dried bark is the preferable form. The fresh bark will sometimes act as a cathartic. It is more stimulating than thoroughwort (*Eupatorium*,) and, therefore, is less applicable during the hot stages of fever. According to Dr. Walker's examination, the bark contains extractive matter, gum, resin, tannin and gallic acid; and Dr. Carpenter announces in it a new principal, *cornine*. Dr. S. Jackson also, from experiment, is satisfied that it contains a principle analogous to quinia. It has been exhibited by Dr. S. G. Morton in intermittent fever, with success. Griffith, in his Med. Bot. 347, mentions that the infusion of the flowers is useful as a substitute for chamomile tea; for analysis, see Am. Journ. Pharm. i, 114; and Phil. Journal Med. and Phys. Sci. xl. Dose of the dried bark in powder, is twenty to sixty grains; the decoction is made with one ounce of the root to one pint of water, or the extract may be employed; alcohol also extracts its virtues. The ripe fruit, infused in brandy, makes an agreeable and useful bitter, which may be a convenient substitute for the article prepared in the shops. Dr. D. C. O'Keeffe, of Georgia, published an article on the *C. Florida* in the So. Med. and Surg. Journal, January, 1849. He gave the extract in doses of ten grains to two drachms, without its producing any disturbance of the stomach, as alleged by some writers. Barton says, in his Collections, that the bark is valuable in a malignant disorder of horses called yellow water. From the gallic acid it contains, a good writing ink may be made, and from the bark of the fibrous roots the Indians extracted a scarlet color. Lindley mentions that the young branches, stripped of their bark, and rubbed against the teeth, render them extremely white. It is often employed for this purpose by persons living in the country.

Where there is need of astringent anti-periodics and tonics, the dogwood bark powdered will be found the best substitute for the Peruvian. Internally and externally, it can be applied

wherever the cinchona barks were found serviceable. The dogwood bark and root, in decoction, or in form of cold infusion, is believed by many to be the most efficient substitute for quinine, also in treating malarial fevers; certainly, it might be used in the cases occurring in camp, to prevent the waste of quinine, as it can be easily and abundantly procured.

Dr. Richard Moore, of Sumter County, informs me that he not only finds it efficient in fevers, but particularly useful, with whiskey or alcohol, in low forms of fevers, and dysentery occurring near our river swamps.

During convalescence also, where an astringent tonic is required, this plant meets our requirements. See *Eupatorium* (boneset) and *Liriodendron* (Poplar.). These, with the blackberry and chinquapin as astringents, the gentians and pipsissewa as tonics and tonic diuretics, the sweet gum, sassafras, and bené for their mucilaginous and aromatic properties, and the wild jalap (*Podophyllum*) as a cathartic, supply the surgeon in camp during a blockade with easily procurable medicinal plants, which are sufficient for almost every purpose. Nitrate and bi-carbonate of potash are most wanted, and with calomel may be procured from abroad. Our supply of opium can be easily reached by planting the poppy, and incising the capsules. Every planter could raise a full supply of opium, mustard and flaxseed. A tonic compound, as advised by the herbalists, is made with the bark of the root of dogwood, colombo (*Frasera*,) poplar, each six ounces; bark of wild cherry, six ounces; leaves of thoroughwort, four ounces; cayenne pepper, four ounces—sifted and mixed. Dose, a teaspoonful, in warm or cold water, repeated.

The berries of the dogwood have also been highly recommended—given as a remedy for fever in place of quinine (1862.)

The wood is compact, heavy, fine grained and susceptible of a brilliant polish. It is used on our plantations wherever a hard wood is required, as in making wedges, the handles of light tools, mallets, plane stocks, harrow teeth, hames, horse collars, etc. Michaux states that the shoots, when three or four years old, are found proper for the light hoops of small portable casks. In the Middle States the cogs of mill wheels are made of dogwood. The branches of the tree are disposed nearly in the form of crosses. *N. Am. sylva.* Farmer's Encyc. I have used

the dogwood for engraving. See "Amelanchier" in this volume.

Dr. Walker makes an excellent ink thus: Half an ounce of dogwood bark, forty grains of sulphate of iron, the same of gumarabic, in sixteen ounces of rain water. Prof. Joseph Jones, of Georgia, has also used it with success. See So. Med. and Surg. J., September, 1861. The wood of the dogwood, like the willow, (see *Salix*,) is preferred in making gunpowder.

RED WILLOW; SWAMP DOGWOOD, (*Cornus sericea*, Ph.) Elliott says it grows in the mountains of South Carolina; sent to me from Abbeville District, by Mr. Reed; North Carolina. Fl. June.

Griffith, Med. Bot. 349. It possesses properties quite similar to those of the *C. Florida*, but it is more bitter and astringent. Mr. R. informs me that it is employed to a great extent in domestic practice in Abbeville. According to B. S. Barton, the bark was considered by the Indians a favorite combination with tobacco for smoking. The young shoots were used to make coarse baskets; and they extracted a scarlet dye from these and the roots.

BLOOD RED DOGWOOD, (*Cornus sanguinea*, L.) Grows, according to Elliott, in the valleys among the mountains. Fl. May.

Dict. de Méd. de Férus. ii, 737; Mathiole, Comment, ii, 119; Journal de Chim. xxxviii, 174, and xl, 107. See, also, Journal de Pharm. for an account of the oil extracted from it. M. Murion says they afford one-third of their weight of a pure and limpid oil, used for the table and for burning. A case of hydrophobia was said to have been cured by it. Griffith, Med. Bot. 349. There also exists in this, as in the others, a red coloring principle, soluble in water alone.

Cornus stricta. Grows in swamps near Charleston; Newbern. Shec. Flora Carol. 449. *C. Circinata* is not included by Chapman among the Southern species, though Dr. Wood says that it grows in Virginia. See U. S. Disp.

LORANTHACEÆ.

Bark usually astringent; berries contain a viscid matter; plants possess the power of rooting in the wood of others.

MISLETOE, (*Viscum verticillatum*, L.) The *V. verticillatum* of Ell. Sk. is not of that Linn. T. and Gray; N. A. Flora. Diffused; grown on oaks; Newbern. Fl. May.

Mér. and de L. Dict. de Méd. vi, 860; Lind. Nat. Syst. Bot. 50; Le. Mat. Med. ii, 456; Journal de Méd. lxx, 529; Eberle, Dis. of Children, 522. Dr. Barham, in the Hortus Americanus, says that the fruit of the misletoe cures epilepsies, pleurisies, coup de soleil, etc. Dém. Èlém. de Bot. iii, 556; employed in paralysis. Thorton's Fam. Herb. 333. Fothergill, Dr. Wilson and Gilbert Thompson use it "with great effect in epilepsy." So, also, Dr. Fraser, who published a work on it. Wade's Pl. Rariores, 82. Eberle, "Dis. of Children," alludes to its employment in infantile epilepsy. Some writers refer to the European species; but this is supposed to be identical with it. The seeds contain a viscid substance resembling bird-lime in appearance, which is insoluble both in water and in alchohol. In Dr. Hunter's edition of Evelyn's Sylvia, it is said to prevent the rot in sheep. Birdlime was formerly made from the berries of the misletoe of oak, which were first boiled in water, then pounded, and the water poured off in order to carry away the seeds and rind. For process, see "Holly" (*Ilex opaca;*) also, Wilson's Rural Cyc., "Birdlime" and "Bird catching."

MISLETOE, (*Phoradendron flavescens*, Nutt.; *Viscum flavescens*, Pursh.) This is the only specie included by Dr. Chapman in his Flora of the Southern United States.

M. Gampert (Ann. de Therap. 1859, 36,) had reported a case in France in which a child three years old was poisoned by eating the berries of the misletoe. Vomiting and prostration were produced, the patient was insensible, with a fixed and somewhat contracted pupil, and coldness of the skin and convulsive movements of the extremities were present; an emetic brought away a considerable quantity of the berries and the child recovered. Prof. Wood, in reporting this in the U. S. Disp., 12th Ed., states that Dr. Henry Dye, of Texas, records (Memphis Med. Record, iv, 344,) several cases of children poisoned by eating the berries of a species growing on the elm, probably *V. flavescens* of Ph. The prominent symptoms were vomiting and great thirst, followed by frequent discharges of bloody mucus from the bowels, with tenesmus. One of the children was found in a collapsed state in which death took place. Dr. Dye states, also, that in another

instance, as he had been informed, children had eaten the berries, without any ill effect.

CUCURBITACEÆ. (*The Gourd Tribe.*)

This order is closely allied to the Passifloraceæ, and is found in most abundance in hot countries. Most of them are valuable articles of food, but are pervaded by a bitter laxative quality, which in the colocynth gourd becomes an active purgative principle.

WATERMELON, (*Cucumis citrullus.*) The juice of the melon by boiling may be converted into a pálatable syrup for table use and one of the best substitutes for molasses. From recent experiments it has been found that about one pint is yielded by each melon, which may be profitably made during a period of great scarcity in the supply of sugar. No doubt, like the ripe fig, beet and other saccharine substances, it may easily be converted into vinegar, and should be added to the vinegar cask. It is well known that the juice is diuretic, and the seeds, by trituration, or by being boiled in water, afford a demulcent and diuretic drink, useful in incontinence of urine and in strangury. Almost the same may be said of the pumpkin, which is used as an article of food for man and beast in many of the Southern States. The harder portions of both melon and pumpkin are used in making preserves by our Southern matrons, and brandy was made from the juice during the war. The melon, the celery and the asparagus are said to yield *mannite.*

PUMPKIN, (*Cucumis pepo*, W.) Cultivated very successfully at the South.

Shec. Flora Carol. 488. The seeds afford an essential oil, which might be made of some value; when triturated with water, they furnish a cooling and nutritive milk, and when boiled to a jelly, they are said by Bechstein to be a very efficacious remedy for retention of urine. The fruit is much used on the plantations at the South as an article of food both for men and animals; pies and preserves of an agreeable flavor are made of it. See Stillé's Mat. Med. and recent medical works for the singularly useful qualities of the seeds, as recently applied by Johnson, Soulé, Jones and others, as a remedy for tape-worm. A paste is made from the seeds, in the quantity of about an ounce

and a half with as much sugar. The dose of the seeds is about two ounces in emulsion, taken in the morning and followed by castor oil. Boston Med. and Surg. J., U. S. Disp. An oil of the seeds is also used. The fruit when dried is useful as a winter provision for armies. An excellent substitute may be found in the pumpkin, which when cut into slips and dried either in the sun or in a dry room, is said to be little inferior to dried apples. The musk-melon (*Cucumis melo*) and cucumber (*C. sativus*) are also largely cultivated at the South.

GOURD; CALABASH, (*Cucurbita lagenaria*, L.) Grows in cornfields and along fences; vicinity of Charleston; Richland; collected in St. John's. Fl. May.

Linn. Veg. Mat. Med. 180; Ed. and Vav. Mat. Méd. 563; Le. Mat. Med. i, 379; Mér. and de L. Dict. de M. Méd. ii, 492. An infusion has been found useful in inflammation of the urinary passages, and the seeds have been employed in rheumatism, strangury and nephritis. Shec. Flora Carol. 479. "Water, which has lain for some time in the fruit of this plant, becomes violently emetic and cathartic." The shells of the dried fruit are sometimes so capacious as to contain four gallons of water; convenient receptacles, water-flasks, dippers, milk pans, etc., are made of them. They must first be deprived of their acrid principle by boiling; moulds for buttons are fashioned out of them, and they are much used for these purposes by the negroes on the plantations. The general reader will recall the "Calebassia Tree," mentioned in "Paul and Virginia," hence the name given to this vine, no doubt by the negroes, from its resemblance to the tree, a native of the east coast of Africa.

CREEPING CUCUMBER, (*Melothria pendula*, L.) Grows in rich, shaded soils; collected in St. John's, Charleston District. N. C. Fl. June.

Journal de Chim. Méd. iii, 498; Mér. and de L. Dict. de M. Méd. iv, 322; Griffith, Med. Bot. 311. The seeds act as a drastic purgative—half a one is a dose for an adult. Martius states that three or four will act powerfully on a horse. Journal de Chim., *loc. cit. sup.*

CACTACEÆ. (*The Indian Fig Tribe.*)

Fruit very similar in its properties to that of the currant tribe; often refreshing, sometimes mucilaginous and insipid.

CACTUS; PRICKLY PEAR, (*Opuntia vulgaris*, Mill. T. and Gray. *Cactus opuntia* of Ell. Sk.) Grows in dry pastures; Newbern. Fl. May.

Mér. and de L. Dict. de M. Méd. vi, 11. The fruit is said to be eatable; the leaves cut transversely are applied to tumors as a discutient; the decoction is mucilaginous, and I am informed that it is much used in Alabama as a demulcent drink in pneumonic and pleuritic inflammations. Its cultivation has been recommended on account of the cochineal insect, which is said to feed on it. Mr. Wm. Summer, of South Carolina, contributes the following to the list of our "expedients:"

To Make Hard Tallow Candles—To one pound of tallow take five or six leaves of the prickly pear, (*Cactus opuntia*,) split them, and boil in the tallow, without water, for half an hour or more; strain and mould the candles. The wicks should have been previously dipped in spirits of turpentine and dried. If the tallow at first is boiled in water, and the water changed four or five times, it will be bleached and rendered free from impurities. Then prepare, by frying with prickly pears, to harden it. In this way we have made tallow candles nearly equal to the best adamantine.

The prickly pear has been generally used (1862) for hardening tallow, with satisfactory results. One pound is added to four of tallow; a larger quantity make the candles too brittle. It takes the place of wax. I have often seen candles which were made hard by this process, and it appears to be a singular property possessed by this plant—and equally singular how it was ever first applied for the purpose.

COCHINEAL CACTUS, (*Cactus cochinilifer.*) Elliott says that it is probable that other species exist, but he does not include this in his sketch of the Bot. of South Carolina. Shecut, however, in his Flora Carol. 319, remarks that "we are indebted to Dr. Garden, of South Carolina, for the discovery of this tree here," well known as the one upon which the cochineal insect feeds. T. and Gray do not include it in their N. A. Fl. The fruit tinges red the urine of those who eat it; and the leaves rubbed up with hog's lard, are useful as a topical application to prevent mortification.

CRUCIFERÆ. (*The Cruciferous Tribe.*)

Lindley states that the universal characteristic of this order is the possession of anti-scorbutic and stimulant qualities, combined with an acrid flavor. The species contain a great deal of nitrogen, to which is attributed their animal odor when rotting.

PEPPERGRASS; VIRGINIA CRESS, (*Lepidium Virginicum*, L.) Wet places. N.C. Common.

It is suitable to be used in winter and early spring salads, but is far less in request than some of the other cresses. Sowings should be made in light, dry earth, the beds protected with dry litter during severe winter. Rural Cyc.

GOLD OF PLEASURE; FALSE FLAX, (*Camelina sativa*, Crantz.) Referred to in Chapman's Botany of Southern States, p. 30, as introduced, growing in cultivated fields. N. Hanover, N. C., Curtis.

See a paper in P. O. Report on Agriculture, 1851, p. 51, on the "Camelina sativa—a new *oil* plant." In some parts of the world it is cultivated for its stems, which yield a fibre applicable for spinning, and for its oleiferous seeds. Mérat says it is cultivated for this purpose in Flanders.

Mr. Wm. Taylor, F. L. S., has recently drawn the attention of agriculturists and others to this as an *oil plant*, adapted for feeding cattle, and for other purposes. He says that the soil best adapted for its cultivation are those of a light nature, but a crop will never fail on land of the most inferior description. It has been found to flourish this year on sandy soils, where no other vegetable would grow, and independent of the drouth the plants have grown most luxuriantly, yielding a large and certain crop. When grown upon land that has been long in tillage and well farmed, the crop will be most abundant. The best time for putting in the seed is as early as possible in the spring months, say from the middle of March or the middle of April to June, and for autumn sowing to August; and the quantity per acre required, fourteen pounds; and may be either drilled or broadcast, but the drilled method should be preferred. If drilled, the rows must be twelve inches apart. As soon as the plants have grown five or six inches high, a hand or horse hoe may be used to cut up the weeds between the rows, and no

further culture or expense will be required. If sown early, two crops may be frequently obtained in one year, as it is fit for harvesting in three months after the plant makes its first appearanee. Or another important advantage may be obtained: if seed is sown early in March, the crop will be ready to harvest in the beginning of July, and the land fallowed for wheat or spring corn; also when barley or small seeds cannot be sown sufficiently early, this may be put in with great success. It is a plant that may be cultivated after any corn crop, without doing the least injury to the land, and may be sown with all sorts of clover; the *leaves* of the *gold of pleasure*, being particularly small, afford an uninterrupted growth to every plant beneath it, and the crop being removed early, the clover has time to establish itself.

The grower of this invaluable production is in all seasons secure of his crop, inasmuch as it is not subject to damage by spring frosts, heavy rains, and drouth, and, above all, the ravages of insects, more particularly the cabbage plant louse, (*Aphis brassica*,) which so frequently destroys rape, turnips and others belonging to the cruciferæ order, when coming into blossom. The seed is ripe as soon as the pods change from a green to a gold color. Care must then be taken to cut it off before it becomes too ripe, or much seed may be lost. When cut with a sickle, it is bound up in sheaves and shocked in the same manner as wheat. The process of ripening completed, it is stacked or put in a barn, and threshed like other corn. The expense of these crops cannot be very great, either in the preparation and culture of the land or in the management in securing the produce afterward; but when grown with care and in good season, the produce will mostly be very abundant—as high as thirty-two bushels and upward to the acre.

The cultivation of this plant for the seed would repay the farmer; an abundance of chaff would be produced, which would be of infinite service for horses or for manure. In a grazing country like England, where vast sums are annually expended for foreign oil cake, the *gold of pleasure* will soon be found an excellent substitute under manufacture, and consequently a grower would find a good remuneration in cultivating the seed. The plant may be considered a valuable production of the earth. A fine oil is produced for burning in lamps, in the manufacture

of woollen goods, in the manufacture of soaps for lubricating machinery, and for painters. The oil cake has been found highly nutritious in the fattening of sheep and oxen, as it contains a great portion of mucilage and nitrogenous matter, which, combined together, are found very beneficial in developing fat and lean. From the experiments above related, it is abundantly proved that it does not suffer from the severest frosts, its foliage not being injured. It is not infested by insects, nor does it exhaust the soil.

The gold of pleasure has been cultivated by several practical agriculturalists, who highly approve of the new plant. For all these reasons it is hoped that every farmer will avail himself of this valuable discovery as a remunerating rotation crop. Mr. Taylor adds that one acre cultivated with these plants yield thirty-two bushels of seed, from which five hundred and forty pounds of oil are obtained; so that the Camelina seems to exceed the flax in its produce of seed, oil and cake per acre. The seed is extremely rich in nutriment. I know of no seed superior to it for feeding cattle. The oil obtained by expression is sweet and excellent, especially for purposes of illumination. From the very small quantity of inorganic matter in the seed, it will be evident that the seed cake must be of a very nutritious character, being merely the seed deprived of a portion of its water and oily matter. We have examined some of the oil obtained from the seed of the *Camelina sativa*, and which has been recently sent to several medical men by Mr. Taylor, under the belief that it possesses valuable medical properties. It is of a yellow color, and smells something like linseed oil. Finding it of service in relieving the incessant cough of an animal, Mr. Taylor has extended the use to the human subject, and states that it has cured several persons affected with diseased lungs and *asthma*.

In a brief notice, P. O. Reports, 1850, is the following statement: "Camelina sativa, (*Miagrum sativum*,) an annual from France, produces a finer oil for burning than rape, having a brighter flame, less smoke and scarcely any smell. It succeeds well in light, shallow, dry soils; and in our Middle and Southern States it would probably produce two crops in a season. Besides the use of the seeds for oil, the stems yield a coarse fibre for making sacks and a rough kind of packing paper, and the whole

plant may be employed for thatching. The culture is similar to that for flax." See "Linum" in this volume.

SHEPHERD'S PURSE, } *Capsella Bursa-pastoris*, Mœnch and T. and G. *Thlaspi*. Linn. and Ell. Sk. Grows in damp pastures; collected in St. John's; Newbern. Fl. May.

Ray's Cat. Plantarum, 47; Bergius, Mat. Med. ii, 389; Le. Mat. Med. i, 243; Mér. and de L. Dict. de M. Méd. vi, 732. It astringes and constipates; hence employed in dysentery, diarrhœa and bloody urine; the juice placed on a piece of cotton, and inserted in the nostril, will arrest hemorrhage. "Externe vulneribus solidandis adhibieter nec sine successu." Fl. Scotica, 342; Linn. Veg. M. Med. 128.

CRESS, (*Sisymbrium nasturtium*, L. and Ell. Sk.; *Erysimum* of Bot.) Nat. in the upper part of South Carolina; vicinity of Charleston. Fl. March.

Fl. Scotica, 351. The young leaves furnish an agreeable salad; the plant was esteemed useful as an anti-scorbutic, and was employed in removing obstructions of the liver, viscera, jaundice, etc. Thornton's Fam. Herb. 618. The juice acts as a stimulant and diuretic. Haller says: "We have seen patients in a deep decline cured by living almost entirely on these plants." According to Tournefort, the juice, snuffed up the nose, cured cases of polypus of that organ. See Edinburgh New Disp., Flora Med. iii, 138; Pliny, lib. xix, chap. 8; xx, chap. 13. Hoffman and Cullen spoke highly of it as furnishing a mucilaginous application for the heads of infants affected with eruptions. It was acknowledged to have an effect upon the maladies of the skin, engorgement of the abdominal viscera when the blood is depraved, in feeble digestion, etc. U. S. Disp. 1226. This plant is also vaunted in incipient phthsis, in chronic catarrhs, in maladies of the bladder and kidneys, and in hysterical affections. It contains a very bitter and odoriferous essential oil—the seeds yielding fifty-five per cent. of fixed oil. See De Cand. Phys. Veg. i, 298; Journal Gén. de Méd. xxviii, 136; Barbier, M. Méd. 242. Moreau asserts that vertigo and discoloration of the face are produced in those eating this plant; but this is an effect unnoticed by others.

HEDGE MUSTARD, (*Sisymbrium officinale*, Fide Gray; *Erysimum officinale*, Lin. and Ell. Sk.)

This is not included by Mr. Elliott in his Sketches of the Plants of South Carolina. It was one of the specimens sent to Professor Gray, and determined by him; collected in St. John's Berkeley; Charleston District; North Carolina. The herb is said to be diuretic and expectorant; the seeds possess considerable pungency, and have been recommended in chronic cough, hoarseness and ulceration of the mouth and fauces; the juice of the plant in honey or the seeds in substance may be used.

WATER RADISH, (*Sisymbrium amphibium*, L.) Rare; roots immersed; collected on causeway near Brunswick Pl., T. W. Peyre's, in St. John's; vicinity of Charleston.

Mér. and de L. Dict. de M. Méd. vi, 365. Recommended for tape-worm by Didelot, and in the old works as an anti-scorbutic. Mérat says the "young leaves are eatable in the spring; probably possessed of similar properties with the *S. nasturtium*."

WATER CRESS, (*Nasturtium officinale*, R. Br.) Introduced. Ditches Florida, and northward. Chap. N. C.

This plant came into pretty high favor about a century ago as a spring salad; and it soon obtained preference to all other spring salads on account of its agreeable, warm, bitter taste, and for the sake of its purifying, anti-scorbutic and diuretic properties. It was greedily gathered in all its natural habitats within some miles of London for the supply of the London market, and eventually became an object of regular, peculiar and somewhat extensive cultivation; see methods, etc., Wilson's Rural Cyclopædia.

MUSTARD, (*Sinapis nigra.*) Cultivated throughout the South. Therapeutic virtues well known.

Mustard is a hardy annual, cultivated as a small salad for greens, and for the seed, which are extensively employed for medicinal purposes. The demand for the production of this plant, on account of the value of seeds as a local irritant, should induce every planter and farmer to grow it. Enormous quantities are required to supply armies; besides that, it is largely consumed in every household. The white mustard I have seen cultivated on our plantations, and, maturing early in June, is fully equal in strength to the imported article. It is very easily ground or powdered, and used like English mustard.

The common table mustard is prepared from the flour of the seed. For salad, it is sown thickly, and used like common cress. "Sow early in the spring in two feet drills, and thin to six inches. The crop must be gathered before it is fully ripe, on a cloudy day or early in the morning, to prevent the seed from shelling out."

The "white" is usually preferred for salad, and the seeds are eaten whole as a remedy for impaired digestion. The leaves of this are light green, mild and tender when young; the seed light yellow. The "black" or "brown" is a larger plant, with much darker leaves. "Seeds brown, and more pungent."

For the medical uses of these plants, any of the works on the materia medica will supply information under the head "Sinapis."

Mustard seed oil, says Ure, in his Dict. Arts and Sciences, p. 285, concretes when cooled a little below 32° Fahrenheit. The white or yellow seed afford thirty-six per cent. of oil, and the black seed eighteen per cent.

The reader interested in the culture of mustard can find some information in Wilson's Rural Cyc. He quotes from a prize essay by T. C. Burroughes in 7th volume Royal Ag. Soc. The field culture of both the white and black mustard is practiced for the production of their seeds, with a view either to the expression of oil from them similar to that of cole and rape and poppy, or to the obtaining of oil cake for the use of cattle, or to the grinding them into the well known condimental and medicinal flour of mustard, or to several other economical and pharmaceutical purposes. The crop is reaped, and tied in sheaves like wheat, and is afterward threshed out upon cloths in the field in the same manner as cole. White mustard is generally laid in handfuls on the shuttle, and not tied up. The black mustard is hardier than the white. The quantity of oil obtained from any given weight of black mustard seeds is greater than that obtained from the same weight of coles; but the oil cake is slightly purgative, and requires to be given to cattle with caution, and is commonly ground and sprinkled on their chaff. Wilson also states that the flour of mustard from the seeds of black mustard, is much more pungent, and of much finer quality than that from the seeds of white mustard. It is still the kind most commonly used in France; but it requires to

be manufactured by a nice mechanical process of removing the outer skins of the seeds, or else it has a grayish or very dark color; and, in fact, it is never so prepared as to be entirely freed from its grayishness. The flour of white mustard is generally used in Britain in consequence of its fine color, and the superior facility of manufacturing it. It is often mixed with the black. Rural Cyc. The method of depriving the black mustard seed of its envelop I have been unable to obtain.

Warm water is always the best addition to mustard to elicit the volatile oil. Vinegar lessens its pungency. See Trousseau's Experiments. Mustard has been highly recommended as a substitute for the spring colza and other plants, to be used in the production of oil. "Both species," white and black, yield oil, Thaër says in his Principles of Agriculture, "which is well adapted for burning; and also, when well purified, for the use of the table. A quintal of mustard seed yields from thirty-six to thirty-eight pounds of oil. The biting acridity of the seed exists not in the oil, but in the integument; and the English mustard, which is celebrated for its strength, is said to be made from cakes from which the oil has been expressed." Among the plants mentioned by Thaër as valuable for the oil in their seed, are the oily radish, (*Raphanus chinensis oleiferus*,) the sunflower, and the common poppy, (*Papaver somniferum;*) the oil from the white-seeded variety is preferable on account of its taste. See Thaër also for descriptions of the cultivation of flaxseed, hemp, hops, madder, beets, etc. Many plants, the seeds of which yield oil, are used in making oil cake for agricultural purposes, and as food for animals. The sunflower, which yields a large quantity of seed to the acre, will, it is said, furnish one gallon of oil to the bushel. See "Cotton," "Flax," etc., in this volume.

I obtain the following, on the cultivation of mustard, from the Farmers' Cyclopœdia:

The species of *sinapis*, generally grown in the kitchen garden for domestic purposes, are the white mustard, (*S. alba*,) and the common or black mustard, (*S. nigra*.) The first is the one grown for salads; but the seed of both is employed in the manufacture of mustard.

The soil they succeed in best, is a fine, rich, mouldy loam, in which the supply of moisture is regular; it may much rather

incline to lightness than tenacity. If grown for salading, it need not be dug deep; but if for seed, to full the depth of the blade of the spade. In early spring and late in autumn, the situation should be sheltered; and, during the height of summer, shaded from the meridian sun. For salading, the white may be sown throughout the year; from the beginning of November to the same period in March, in a gentle hot-bed appropriated for the purpose, in one already employed for some other plant, or in the corner of a stove. From the close of February to the close of April, it may be sown in the open ground, on a warm sheltered border; and from thence to the middle of September in a shady one. Both the white and the black, for seed, may be sown at the close of March, in an open compartment.

For salading, it is sown in flat-bottomed drills, about half an inch deep and six inches apart. The seed cannot well be sown too thick. The mould which covers the drills should be entirely divested of stones. Water must be given occasionally in dry weather, as a due supply of moisture is the chief inducement to a quick vegetation. The sowings are to be performed once or twice in a fortnight, according to the demand. Cress (*Lepidium sativum*) is the almost constant accompaniment of this salad herb; and, as the mode of cultivation of each is identical, it is only necessary to remark, that, as cress is rather tardier in vegetating than mustard, it is necessary for obtaining them both in perfection at the same time to sow it five or six days earlier.

It must be cut for use while young, and before the rough leaves appear, otherwise the pungency of the flavor is disagreeably increased. If the top is cut off, the plants will, in general, shoot again; though this second produce is always scanty, and not so mild or tender. For the production of seed, whether for manufacture of mustard or future sowing, the insertion must be made broadcast, thin, and regularly raked in. When the seedlings have attained four leaves, they should be hoed, and again after the lapse of a month, during dry weather, being set eight or nine inches apart. Throughout their growth, they must be kept free from weeds; and if dry weather occurs at the time of flowering, water may be applied with great advantage to their roots. The plants flower in June, and are fit for cutting when their pods have become devoid of verdure. They

must be thoroughly dried before threshing and storing. For forcing, the seed is most conveniently sown in boxes or pans, even if a hot-bed is appropriated for the purpose. Pans of rotten tan are to be preferred to pots or boxes of mould. But, whichever is employed, the seed must be sown thick, and other restrictions attended to, as for the open ground crops. The hot-bed need only be moderate. Air may be admitted as abundantly as circumstances will allow.

CAPPARIDACEÆ. (*The Caper Tribe.*)

CAPER TREE, (*Capparis Spinosa.*) This plant, cultivated in Greece, the Ionian Isles, France, Italy, etc., has also been introduced into this country. The flower buds are collected and put into salt and vinegar. See Patent Office Report, 1855, p. 285, for a brief notice of the cultivation and preparation. In the Southern States we have the *C. Jamaicencis*, Jacy, and *C. cynophallophora*, L., growing in south Florida. It is possible that they may be used as substitutes for the foreign caper.

VIOLACEÆ. (*The Violet Tribe.*)

Roots more or less emetic; a property which prevails to a greater extent in the South American species, which are generally less herbaceous.

VIOLET, (*Viola pedata*, Mich.) Found in the upper districts; sparingly in the lower; Richland, L. Gibbes. N. C. Fl. May.

U. S. Disp. 753; Griffith, Med. Bot. 140. The roots of nearly all the species of this genus possess a nutritive and an emetic principle, called *violine*, allied to that of ipecacuanha, but more uncertain in its operation. This is said to replace the European plant, and, according to Dr. Bigelow, is valuable as an expectorant and demulcent in pectoral affections.

X FIELD VIOLET, (*Viola arvensis*, D. C.) X

Griffith, Med. Bot. 141. This and the *V. tricolor*, of which it is a variety, have received considerable attention from European writers, especially the German. Strack made them the subject of a discussion in 1776, and since then the observations of Metzer, Cloquet and others have shown that they are pos-

sessed of much efficacy in the treatment of cutaneous diseases, and especially of that obstinate and unpleasant eruption, crustea lactea. The fresh plant, or its juice, is to be used, as drying destroys its active qualities. Strack states that, when the remedy has been given for some time, the urine becomes extremely fetid, smelling like that of the cat; *op. cit. supra.* Attention is invited to it. See *V. tricolor.*

WILD PANSY, HEARTSEASE, (*Viola tricolor*, Linn.) Cultivated in gardens. N. C. Fl. May.

Trous. et Pid. Traité de Thérap. et de Mat. Méd. ii, 15; U. S. Dis. 743; Le Mat. Med. ii, 453; Griffith 40; Thornton's Fam. Herb. 731. It was formerly considered a valuable remedy in epilepsy, ulcers and scirrhus. See Störck de V. tricolor, Erlang. 1782. Metzer de crustea lactea infantum, ejusdem que remedio præmio coronavit. 1776. Lond. Med. Journal. A handful of the fresh, or one ounce and a half of the dried herb, was boiled in milk, which was taken twice a day; bread soaked in this was also applied to the affected parts. It was much boasted of as a remedy in the latter disease; see Mér. and de L. and the Art. *V. arvensis.* Bergius, speaking of these two, says that half an ounce in twelve of water produces a consistent and valuable demulcent jelly.

HAND-LEAVED VIOLET, (*Viola palmata*, Linn.) Collected in St. John's; vicinity of Charleston; Newbern. Fl. March.

Ell. Bot. 300, Med. Notes. The plant is very mucilaginous. It is employed by negroes for making soup, and is commonly called wild okra. The bruised leaves are used as an emollient application.

COMMON BLUE VIOLET, (*Viola cucullata*, Ait.) Grows in damp pine lands; collected in St. John's; vicinity of Charleston. N. C. Fl. May.

This plant has been used for making soup during war times. To it may be added the wild okra, the dock and the lamb's quarter.

Le. Mat. Med. i, 223. Probably possessed of similar properties with the others; a decoction is given to children in eruptive diseases. These plants might very conveniently be used in domestic practice, and I would invite attention to their further employment.

CYSTACEÆ. (*Rock Rose Family.*)

FROST WORT; FROST WEED OR ROSE, (*Helianthemum canadense*, Mx.) Fla. and N. C. and northward.

Dr. Ives, of N. Haven, first recommended it in scrofula, and Dr. Isaac Parrish, of Philada., informed Dr. Wood that he had used it with much apparent benefit as an internal remedy in scrofulous affections of the eye. In a pamphlet upon the Frost-weed by Dr. D. Tyler, published at N. Haven, 1846, it is stated that *H. corymbosum* possesses similar properties. He found both species useful in scrofula, diarrhœa and secondary syphilis, and locally as a gargle in scarlatina, and a wash in prurigo. The plant has been used in the forms of powder, decoction, tincture and syrup; and may be given freely with impunity. Dr. Tyler, however, has known the strong decoction and the extract to produce vomiting. He considers two grains of the latter as a full dose for an adult. The herb has an astringent, slightly aromatic and bitterish taste, and appears to possess tonic and astringent properties. Dr. Wood says that attention has only been attracted recently to it as a medicine. U. S. Disp., 12th Ed.

Dr. Parrish, in his Pract. Pharmacy, p. 231, furnishes a syrup of this plant which he says was much used by Dr. Isaac Parrish in scrofulous affections of the eyes, and by others in diseases of the scrofulous type. Four ounces of the herb, sixteen ounces of sugar are boiled down with alcohol and water, till the liquid is reduced one-half; given in doses of a fluid drachm three times a day.

DROSERACEÆ. (*The Sun Dew Tribe.*)

Plants generally slightly acid; acrid and poisonous to cattle.

SUN DEW, (*Drosera rotundifolia*, Linn.) Grows in damp spots in the low country of South Carolina; Richland; collected in St. John's; Newbern. Fl. June.

Bull. Plantes Vén de France. Vicat mentions it as an active and corrosive plant; the liquor which exudes from the hairs destroying warts, corns, etc. Dém. Élém. de Bot. ii, 334. M. Geoffroi asserts that it is a valuable pectoral, employed in ulcers of the lungs, asthma, etc.; the infusion being generally used. The juice has been recommended in dropsies, diseases of the

kidneys, ophthalmias, etc. Mér. and de L. Dict. de M. Méd. ii, 690. Shec., in his Flora Carol. 519, confirms the opinion in reference to the corrosive property of the juice, and adds that, with milk, it furnishes a safe application for removing freckles; any part of it will curdle milk. Fl. Scotica, 109. It is thought to be very injurious to sheep, producing in them consumption or rot. M. Berlace affirms (Esquiss. Hist. Bot. Aug.) that cattle avoid it on account of an insect (Hydra hydatula) which feeds on it. This plant is quite diminutive, and has heretofore received very little attention. I see no mention made of it in our Am. Dispensatories.

PASSIFLORACEÆ. (*The Passion Flower Tribe.*)

MAY APPLES; MAY POPS; PASSION FLOWERS, (*Passiflora lutea and incarnata*, L.) Grows in pastures, *passim*.

The fruit of these beautiful climbing plants, which should not be confounded with the wild Jalap, (*Podophyllum*,) sometimes called may apple and growing in rich woods, contains a sweetish, acid pulp, and is eatable. Several of the species are employed in medicine; but these have received no attention, being more remarkable on account of the structure of their flowers. One is quite diminutive. In some portions of South Carolina the weed is used as greens and for making soup.

In a paper in Richmond M. Journal, for July, 1867, Dr. D. L. Phares, of Newtonia, Miss., recommends the May pop very highly as a remedy for tetanus. He states that in 1838, Dr. W. B. Lindsay, of La., had directed his attention to it, and that "he used it for thirty years with extraordinary success in all cases of tetanus neonatorum." Dr. L. says it never stupefies, but is serviceable in "all sorts of neuralgic affections." He also employs the aqueous extract of the root as an application for chancres, in irritable piles, for erysipelas and recent burns. The eulogy is couched in rather extravagant terms.

The author directs that the leaves should be gathered in May, or before forming fruit; it is pounded and the juice expressed through a strong cloth into shallow glass or porcelain dishes to dry as rapidly as possible in the shade. When dry it is reduced to powder in a mortar, bottled and closely corked. The dose of this powder is from one to four teaspoonsful, repeated. For external use, the whole plant, including the root, may be boiled

for an hour, the extract thus obtained being further boiled down to a proper consistence.

I may add that Griffith, in his Med. Bot., refers to the edible fruit of the *P. quadrangularis*, or Granadilla, and in speaking of the foreign species he says: "In a medical point of view, they are also of some interest, being possessed of active qualities capable of fulfiling a variety of indications, though it should be noticed that our information in regard to them is far from definite. The only memoir on the subject, deserving of notice, is that of Dr. Ricord Madiana (Journ. de Pharm. xvi, and Ann. Lyc. Nat. Hist. 1,) on the *P. quadrang.*; a decoction of the root of this he found to be poisonous, acting like a narcotic; he discovered in it a peculiar principle which he calls *passiflorine.*" Brown, in his Hist. of Jamaica, says a tincture of the flowers of the *P. rubra* is used as a substitute for laudanum. The experience, therefore, of Dr. Phares, with reference to our species, should encourage others to test their value.

HYPERICACEÆ. (*The Tatsan Tribe.*)

The juice of many of the species is slightly purgative and febrifugal.

ST. PETER'S-WORT, { *Ascyrum Crux Andreæ*, W. / *Ascyrum multicaule*, Mx. }

Collected in pine land soils; St. John's; vicinity of Charleston; Newbern. Fl. July.

The infusion of the bruised root and branches of this plant was used by an Indian with success in the case of a female, under my observation, with an ulcerated breast, which had resisted all other attempts at relief. I have since seen it employed with entire satisfaction on the person of an infant, having a painful enlargement of the sub-maxillary gland. No further opportunity has been afforded of ascertaining its properties with certainty; but it seems to be possessed of some power as a resolvent in discussing tumors, and reducing glandular enlargements; given internally and applied topically. The taste is somewhat acrid. I would invite further examination. See *Hypericum perforatum*.

ST. JOHN'S-WORT, (*Hypericum perforatum*, L.) Sparingly naturalized in the Southern States. S. and N. C.

It was greatly in vogue at one time, and was thought to cure demoniacs. The decoction was also given in hysteria and suppressed menstruation. Thornton's Family Herbal, 67. The coloring matter gives a good dye to wool.

The plant called St. John's-wort, which I think is *Ascyrum cruxandréæ*, growing abundantly throughout our country, is popularly regarded as of great value, bruised and applied in the healing of wounds, and as a discutient. I have known a decoction of the whole plant used successfully as a local application in prurigo and in "camp itch," lamp oil being also applied alternately with it. I have used it with great satisfaction (1868) without the oil.

Wilson states that its leaves and flowers are strongly resiniferous or oleiferous, and emit a powerful odor when rubbed; it bleeds under very slight compression or wounding, and imparts a blood-red color to any spirituous or oleaginous substance with which it is mixed, and was formerly supposed to possess the power of healing wounds, bruises and contusions. It is the *Fuga Dæmonium*, he adds, of old herbalists, and was held to influence conjurations and enchantments. It yields a good yellow dye to woven fabrics, from its flowers, and a good red dye from its leaves. The juice of the hypericums are often exceedingly similar to gamboge. Rural Cyc. The plant has a resinous odor, and Dr. Darlington says is believed to produce troublesome sores on horses and horned cattle, especially those which have white feet and noses. The dew which collects on the plant appears to become acrid. Flora Cest. Farmers' Encyc. I found the same impression prevailing in Powhattan County, Va. There it is known to cause blindness in horses and troublesome sores on the legs, particularly in white horses with delicate skins. Dr. John Harvie, of Va., informs me that five of his were made blind by this plant in one season They sometimes recover. The plant proves injurious by being eaten with hay, and it gets in contact with the skin or the eye when the animal is browsing. See *Ascyrum cruxandréæ*. I find that Griffith also, in speaking of *H. perforatum*, says that it is observed to exercise "an injurious effect on cattle by inflaming the skin wherever the skin is white, but he is inclined to attribute this to a species of Euphorbia growing with it." This opinion was entertained by some persons in Virginia. The ear-

lier writers attributed to the St. John's-wort great virtues as a febrifuge and anthelmintic. In this country, adds Dr. Griffith, "it is only used to make an oil or ointment, which is said to be an excellent application in ulcers, the reduction of tumors, etc.; and from some trials with it, we are disposed to think favorably of it. It is made by infusing the flowers in oil or lard until these substances are tinged of a red color. The first of these preparations, though perfectly fluid at first, has a tendency to solidify when kept." It is observed by Cullen, in his Mat. Med. 173, "we should not be so audacious as to neglect it, for by the sensible qualities it appears active," "and there are many well vouched testimonies of its virtues, particularly of its diuretic powers." Blair, in Am. Jour. Phar. ii, 23, says its active constituents appear to be an acrid, resinous substance in the whole plant, a red oil furnished by the glands on the petals and some tannin. A tincture of the flowers and leaves are used in stomach complaints. M. Dussauce, in his Treatise on Tanning, 1867, says that the flowers and flower tops may be used for tanning leather.

PINE WEED; ORANGE GRASS, (*Hypericum sarothra*, Mich., T. and G. *Sarothra gentianoides* Linn. and Ell. Sk.) Grows in dry pastures; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Mér and de L. Dict. de M. Méd. vi, 226; Journal de Méd. lxxx, 360. It is employed as an aperient in inflammatory affections.

ACERACEÆ. (*The Sycamore Tribe.*)

RED MAPLE, (*Acer rubrum*, Linn.) Diffused.

Shec. Flora Carol. 80. The wood is much used in the manufacture of Windsor chairs, gun-stocks, etc.; the grain is sometimes beautifully curled. In a communication received from J. Douglass, M. D., of Chester District, S. C., his correspondent, Mr. McKeown, states that the country people consider a strong decoction of the bark, with white sugar, used as a wash, a safe and certain cure for ordinary ophthalmia. Some of the inhabitants of the Western States make sugar by boiling down the sap of the white maple, which, however, like that of the red maple, yields only half the proportion of sugar obtained from the juice of the sugar maple. Farmer's Encyc.

M. Dussauce in his "Complete Treatise on the art of Tanning," etc., 1867, states that the sap or juices of "maple, beech and oak" furnish tannin.

SUGAR MAPLE, (*Acer saccharinum*, Linn.) Var. *Floridanum*, found in south Florida. Chap. Diffused, but more abundant in the upper districts; found sparingly at the head waters of Cooper River, St. John's, Berkeley; Newbern, N. C. Fl. Feb.

Shec. Flora Carol. 90. Pure flake manna has been discovered in this species. Sugar extracted from it is an article of trade; it is employed medicinally also. The wood is esteemed in the manufacture of saddle-trees. The grain of the wood is fine and close, and when polished it has a silky lustre.

The timber of old trees is extensively used in America for inlaying mahogany, and it possesses, in an eminent degree, the same kind of bird's-eye markings which distinguish the timber of the Norway maple. The wood is heavy and strong, but not durable. The ashes are very rich in alkaline matter, and furnish a large proportion of the potash which is imported to Europe from New York and Boston. Rural Cyc. I have seen the sugar maple boxed as low down as Middle Virginia, but have never heard of any sugar being made from the tree in States south of Virginia. Maple and sweet gum barks, with copperas, will dye a purple color; maple, red oak bark and copperas to fix it, will dye dove color; maple, with bark of black walnut, (*Juglans nigra*,) gives a brown color; sweet gum, with copperas, yields a color nearly black. See, also, "*Quercus*," "*Hopea*," etc. See Boussingault's Treatise, "Rural Economy, in its Relation to Chemistry, Physics," etc., p. 125, for valuable instruction on cultivation, production, etc., of sugar from maple, beet, etc.; also, Ure's Dictionary of Arts, Manufactures and Mines, article "Sugar, beet," etc. Wilson, in his Rural Cyc., article "Acer," which the reader may consult, states that the sap of the maple also contains ammonia, and has, therefore, all the conditions for forming the nigrogenous components of the branches, leaves and blossoms; and in proportion as these parts of the tree are developed, it gradually loses its ammonia, and when they are completely formed it ceases to flow. Rural Cyc. Liebig discovered that ammonia was emitted from this juice when mixed with lime. The sugar crystalized spon-

taneously. The American practice with the sugar maple is to bore two auger holes, three-fourths of an inch in diameter, and half an inch deeper than the bark, in an obliquely ascending direction, on the south side of the tree, at the height of about eighteen or twenty inches from the ground, in February or March, while the snow is on the ground, and the cold is still intense, and to insert into the holes elder or sumac tubes, partially laid open, eight or ten inches in length and three-fourths of an inch in diameter, communicating at the lower end with troughs of two or three gallons in capacity, for the reception of the sap. Four gallons are usually sufficient to yield one pound of sugar; and eight to sixteen gallons are usually obtained in a season from a single tree—this must depend upon the locality. *Op. cit.* I insert the following from the Farmer's Encyc.:

"In a central situation, lying convenient to the trees from which the sap is drawn, a shed is constructed, called a sugar-camp, which is destined to shelter the boilers and the persons who tend them from the weather. An auger, three-fourths of an inch in diameter, small trough to receive the sap, tubes of elder or sumac, eight or ten inches long, corresponding in size to the auger, and laid open for a part of their length, buckets for emptying the troughs and conveying the sap to the camp, boilers of fifteen or eighteen gallons capacity, moulds to receive the syrup when reduced to a proper consistency for being formed into cakes, and, lastly, axes to cut and split the fuel, are the principal utensils employed in the operation. The trees are perforated in an obliquely ascending direction, eighteen or twenty inches from the ground, with two holes four or five inches apart. Care should be taken that the augers do not enter more than half an inch within the wood, as experience has shown the most abundant flow of sap to take place at this depth. It is also recommended to insert the tubes on the south side of the tree; but this useful hint is not always attended to.

"A trough is placed on the ground at the foot of each tree, and the sap is every day collected and temporarily poured into casks, from which it is drawn out to fill the boilers. The evaporation is kept up by a brisk fire, and the scum is carefully taken off during this part of the process. Fresh sap is added from time to time, and the heat is maintained till the liquid is re-

duced to a syrup, after which it is left to cool, and then strained through a blanket, or other woollen stuff, to separate the remaining impurities.

"Some persons recommend leaving the syrup twelve hours before boiling it for the last time; others proceed with it immediately. In either case the boilers are only half filled, and by an active, steady heat the liquor is rapidly reduced to the proper consistency for being poured into the moulds. The evaporation is known to have proceeded far enough when, upon rubbing a drop of the syrup between the fingers, it is perceived to be granular. If it is in danger of boiling over, a bit of lard or of butter is thrown into it, which instantly calms the ebullition. The molasses being drained off from the moulds, the sugar is no longer deliquescent, like the raw sugar of the West Indies.

"Maple sugar manufactured in this way is lighter colored, in proportion to the care with which it is made, and the judgment with which the evaporation is conducted. It is superior to the brown sugar of the colonies, at least to such as is generally used in the United States; its taste is as pleasant, and it is as good for culinary purposes. When refined, it equals in beauty the finest sugar consumed in Europe. It is made use of, however, only in the districts where it is made, and there only in the country; from prejudice or taste, imported sugar is used in all the small towns and in the inns.

"The sap continues to flow for six weeks; after which it becomes less abundant, less rich in saccharine matter, and sometimes even incapable of crystalization. In this case it is consumed in the state of molasses, which is superior to that of the islands. After three or four days exposure to the sun, maple sap is converted into vinegar, by the acetous fermentation. The amount of sugar manufactured in a year varies from different causes. A cold and dry winter renders the trees more productive than a changeable and humid season. It is observed that when a frosty night is followed by a dry and brilliant day the sap flows abundantly; and two or three gallons are sometimes yielded by a single tree in twenty-four hours. Three persons are found sufficient to tend two hundred and fifty trees, which give one thousand pounds of sugar, or four pounds from each tree. But this product is not uniform, for many farmers

on the Ohio do not commonly obtain more than two pounds from a tree. Trees which grow in low and moist places afford a greater quantity of sap than those which occupy rising grounds, but it is less rich in the saccharine principle. That of insulated trees, left standing in the middle of fields or by the side of fences, is the best. It is also remarked that, in districts which have been cleared of other trees, and even of the less vigorous sugar maples, the product of the remainder is, proportionally, most considerable. 'Having introduced,' says a writer, 'twenty tubes into a sugar maple, I drew from it the same day twenty-three gallons and three quarts of sap, which gave seven and a quarter pounds of sugar; thirty-three pounds have been made this season from the same tree, which supposes one hundred gallons of sap.' It appears here that only a little more than three gallons was required for a pound, though four are commonly allowed."

Mr. M. Eames furnishes the following account of his process:

"I gather my sap to one large reservoir once in twenty-four hours; then it is boiled each day to syrup, which is about half the sweetness of molasses; it is then taken out and strained through a flannel cloth, and put into a tub or barrel to cool and settle for twelve hours—(I use a sheet-iron pan set in an arch of brick; the pan is made of Russia iron, eight feet long, four feet wide, and six inches deep;) it is then taken out, and I am careful not to move the bottom where it has settled, and place it in a kettle and heat it to ninety-eight degrees. I then add (for one hundred pounds) the whites of four eggs, two quarts of milk, and one ounce of saleratus—the eggs well beat up, and the saleratus well dissolved—and stir the whole well together in the syrup; and when the scum has all risen, it is to be taken off, and be sure it does not boil before you have done skimming it. Then it is boiled until it is done, which you will know by dropping some into water; which, if done, will form a wax. It then must be taken from the kettle and placed in tinpans to cool and form the grain; and as soon as the grain is sufficiently formed, I then pour it into tunnel-shaped boxes to drain, and after twenty-four hours I place a flannel cloth on the top, and take the plug from the bottom and let it drain. The flannel cloth I keep wet from day to day."

SAPINDACEÆ. (*Soapberry Tribe.*)

SOAPBERRY, (*Sapindus marginatus.* Willd.) Florida and Georgia, near the coast.

The skin of the fruit of *S. emarginatus* is said to be used in India for the same purposes as soap. That of the *S. saponaria*, which grows in the West Indies, is employed for washing linen, but when employed often is apt to burn and destroy it; the nuts are very smooth and of a shining black color, and were formerly imported to England and manufactured into buttons, which were sometimes tipped with silver and always very durable. Wilson's Rural Cyc. Our species should be examined. It will be observed that it is very nearly related to the buckeye, (*Æesculus*,) the roots of which are also used for washing woollens. See, also, "*Saponaria*," in this volume.

Cardiospermum halicacabum, L. S. Fla. "Apparently native but not uncommon in cultivation." Chap.

The root is sudorific, diuretic and aperient; and on the Malabar coast the leaves are considered efficacious in pulmonic affections. Anslie, II, 204, Griffith.

The *Dodonæa viscosa* also grows in S. Fla.

ÆSCULACEÆ. (*The Horse Chestnut Tribe*).

The seeds contain a great quantity of nutritive starch; also a sufficient amount of potash to be useful as cosmetics, or as a substitute for soap.

HORSE CHESTNUT; BUCKEYE, (*Æsculus pavia*, L.) Diffused. I have observed it in Greenville, Fairfield and Charleston Districts; vicinity of Charleston, Bach.; North Carolina. Fl. May.

Shec. Flora Carol. 105; Griffith's Med. Bot. 214. The fruit is about the size of a small lemon, and of a beautifully polished mahogany color externally; it contains a great deal of starch. Dr. Woodhouse prepared a half a pint from the nuts, which retained its color for two years. It is superior to the famous Portland starch, and does not impart a yellow color to cloth. It is said that the washing from this is narcotic and poisonous. Dr. McDowel tried the powder of the rind, and states that ten grains were equivalent to three of opium; a strong decoction

is recommended as a lotion to gangrenous ulcers. A strong decoction of the root is said to relieve toothache when held in the mouth. The fresh kernels, macerated in water, mixed with wheat flour into a stiff paste and thrown in pools of standing water, intoxicate fish, so that they float on the surface, and may be taken; reviving, however, when placed in fresh water. I am informed that large quantities were formerly caught in this way in the swamps along the Santee River. See, also, Ell. Bot. Med. Notes. The roots are preferred even to soap for washing and whitening woollens, blankets, and dyed cottons—the colors of which are improved by the process. Satins washed in this manner and carefully ironed, look almost as well as new.

The Buckeye has been used in St. John's, Berkeley, S. C., (1863,) to fix the color of cotton fabrics, muslins, etc., when alum ox gall, sugar of lead, etc., had proved inefficient. Bedsteads made of the horse chestnut are said not to be infested by bugs. I am told that in the West they use the buckeye to prevent piles, worn about the loins as an amulet!

POLYGALACEÆ. (*The Milkwort Tribe.*)

Bitterness in the leaves, and milk in the roots, are their usual characteristics.

SENEKA SNAKEROOT; MOUNTAIN ELAX, (*Polygala Senega*, L.) Mountainous districts of South and North Carolina. Fl. July.

Thornton's Fam. Herb. 629. An active stimulant, increasing the force of the circulation, especially that of the pulmonary vessels; hence, found very useful in typhoid inflammation of the lungs. Dr. Brandreth, of Liverpool, has derived great service from its employment, in cases of lethargy, in the form of an extract combined with carb. ammoniæ. It has been given in dropsical cases, and as it sometimes provokes plentiful discharges by urine, stool and perspiration, it is frequently the means of removing the disease after the ordinary cathartics, diuretics and hydragogues have failed. The Indians use it in snake bites, given internally and applied topically; if beneficial, it only acts as a diffusible stimulant; it is administered, also, as a gargle in croup. A principle called *sene-*

gin has been discovered in it; and one by Reschier, called *polygalic* acid. Quevenne is also said to have detected two: *polygalic* and *Virgineic*—the first of which will unite with bases; the second volatile, oily, nauseant and emetic in small, diaphoretic, expectorant and diuretic in large doses. Stephens & Church, 103. See Analysis in Journal de Pharm. xxii, 449. One of the principles referred to is said not to differ from *saponine*. Supplem. to the Dict. de M. Méd. by Mér. and de L. 1846, 578; M. Guibourt, in his "Abridged Hist. of Simple Drugs;" Carson's Illust. Med. Bot. 1847, pt. i; L. Feneulle's Annal. Journal de Pharm. ii, 430. It has been employed in pleurisy. See Tennent's Essay on that disease; Duhamel, Mém. de l'Acad. de Paris, 1739, 144; McKensie's Med. Obs. and Enquiries, ii, 288; De Haen. Ratio Medendi: F. d'Ammon "sur l'emploi et l'utilité de la racine du P. séréga dans plusieurs mal. de l'œil;" Annal. de Chim. de Heidelberg. Dr. Ammon, of Dresden, in his paper, employs it in ophthalmias, after the inflammatory stage is passed; it is said to prevent the formation of cataract, and to promote the absorption of pus in hypopion; he reports two cases; it is adapted, in fact, to all cases of exudation, by its power of promoting discharge. Suite des Expériences, in Bull. des Sci. Méd. xx, 241. Bretonneau gave four to five grains, every hour, in croup; it opposes the formation of the diphtheritic membrane. Bull. des Sci. Méd. de Férus. xi, 61; Mém. sur le Sénéga, Acad. des Sci. See Mérat, loc cit. Dr. Milne spoke highly of the decoction, joined with bitartrate of potash, in dropsy. Dr. Percival administered it in dropsy of the chest. If the decoction causes vomiting, some aromatic, angelica, calamus, or fennel may be added. It is prescribed as a drink in pneumonia, pleurisy and typhoid fever. Linnæus, in his Veg. Mat. Med. 137, speaks of this plant as a specific in croup (*specificum in phlogose hinc officinis nostris dignissima.*) Lind. Nat. Syst. Bot. 87. It acts as a stimulant, diuretic, sialagogue, expectorant, purgative, emetic, sudorific, and is also emmenagogue. U. S. Disp. 649; Big. Am. Med. Bot. ii, 27; Bart. M. Bot. ii, 111; Mér and de L. v, 424; Dict. des Sci, Méd. li, 1; Journal de Chim. Méd. ii, 431; Journal Analyt. i, 339. Employed in nervous affections, and hectic fever; in hydrothorax, from its stimulating effect on the kidneys, and in diseases of the lungs, from its augmenting the absorbent forces.

Anc. Journal de Méd. lxxvi, 53; Detharding, Diss. de Sénéga, 1749; C. Linn. Diss. upon the Root of the Senega, Argentorati, 1750; Kielhon, Diss. Frankfort, 1765; Helminth, at Edinburgh, 1782; G. Folchi, "Rech. chimico—Thérap. sur la racine du polygala du Virginie." In pneumonia, after bleeding, and in the typhoid stage, it is one of our best remedies for promoting expectoration; at an earlier period it is too stimulating. Much use is made of it on the plantations in South Carolina for this purpose. According to Dr. Bree, it is eminently useful in the asthma of old people, and in the latter stages of croup. It has been employed successfully in chronic rheumatism, and Dr. Chapman also found it very efficacious in recent cases of amenorrhœa. Frost's Elems. 258; Griffith's Med. Bot. 225; Archer's Med. and Phys. Journal, i, 83; Bree on Asthma, 258; Massie's Inaug. Diss. Phil. 1803; Thacher's Disp. 319; N. Eng. Journal, vii, 206. In croup, it is often given in the form of hive syrup; the best form, however, is a decoction made by boiling one ounce of the root in one pint and a half of water, till it is reduced to a pint, the dose of which is a tablespoonful; thirty grains of the powdered root may be given in substance. This plant is employed by the steam practitioners. See Howard's Syst. of Bot. Med. 343.

BLOOD RED POLYGALA, (*Polygala sanguinea*, L. Nutt.) Grows in flat, pine lands; abundantly near Purysburg; sent to me from Abbeville by Mr. Reed; vicinity of Charleston, Bach. North Carolina. Fl. June.

Lind. Nat. Syss. Bot. 86; Barton's Med. Bot. ii, 17. A stimulating diaphoretic, similar, it is supposed, in properties to the above. Mér. and de L. Dict. de M. Méd. v, 424; Griffith, Med. Bot. 225.

Polygala paucifolia, Willd. Grows in the mountains of South and North Carolina. Fl. August.

Griffith, Med. Bot. 227. Rafinesque, in his Med. Flora, says it is possessed of active properties; the root having a sweet, pungent, aromatic taste, similar to that of the winter green (*Gaultheria procumb.;*) he thinks it milder than the *P. senega*, and, therefore, adapted to cases in which that is inapplicable. Griffith does not agree with him, attributing to it merely tonic and bitter properties.

Polygala rubella, Willd. *Polygama*, Walter. Vicinity of Charleston.

The whole plant is officinal. In small doses it is tonic, in larger, laxative and diaphoretic. The infusion of the dried plant has been usually employed to impart tone to the digestive organs. (Bigelow.) It appears, adds Dr. Wood, to be closely analagous in medical virtues to the *Polygala amara* of Europe, which is used for a similar purpose. U. S. Disp., 12th Ed.

The fresh root of *P. lutea*, yellow bachelor's button, growing throughout the Southern States, emits a taste similar to that of the Gaultheria.

Krameria lanceolata, Torr. S. Fla. It is highly probable that this might be used as a substitute for the officinal Rhatany which is such an excellent astringent. Griffith.

CEDRELACEÆ. (*Mahogany Tribe.*)

MAHOGANY, (*Swietenia mahagoni*, L.) South Florida. Chap. So. Flora.

This tree is cut down in August. See description of method pursued in Honduras, Wilson's Rural Cyc.

The uses of the wood are so well known as to need no further description.

The bark which has the properties of the *S. febrifuga*, which is employed in the East in intermittent fever in doses of thirty grains, may, it is said, be used as Peruvian bark. I do not know that the tree is "exploited" in Florida.

LINACEÆ. (*The Flax Tribe.*)

FLAX, L. (*Linum usitatissimum.*) Cultivated in the Southern States.

It is cultivated here pretty much on account of the seeds, which are well known for their valuable demulcent properties, and for the linseed oil which they afford. Immediate attention should be paid to raising on a very much larger scale both this plant, the mustard and the castor oil. Flax matures well in this latitude. For much useful information in reference to the economical application of this plant, see Mér. and de L. Dict. de M. Méd. Sup. 1846, 435.

Among the *thread plants* may be mentioned Ramie Flax, (*Linum usitatissimum,*) Perennial Flax, (*Linum perenne,*) Hemp (*Cannabis sativa,*) Virginian Silk, (*Asclepias · syriaca,*) Common nettle, (*Urtica dioica,*) and the Rosebay willow herb, (*Epilobium angustifolium.*) The three latter are all found growing wild in South Carolina. The Asclepias was planted for the purpose in Germany, but is an imperfect substitute for hemp or flax. See *A syriaca* in this volume. The stem of the hop has also been used for the production of thread. They require further examination. See Thaër's work, "Principles of Agriculture," p. 461. Hemp seeds also yield oil.

The best drying oils, Chaptal states ("Chemistry applied to Agriculture," p. 145,) are those of flaxseed, nuts and poppies. Linseed oil will dissolve at boiling temperature one-quarter of its weight of that oxide known in commerce by the name of litharge. It becomes brown in proportion as the oxide is dissolved; when saturated with the oxide it thickens by cooling, and it is necessary to render it liquid by heat at the time of using it. Linseed oil saturated with the oxide and applied with a brush to any substance, hardens readily and forms a coating impervious by water, and much resembles gum elastic; linen or silk prepared with it is flexible without being adhesive. A cement of this oil, prepared with the oxide and mixed with the refuse or broken fragments of porcelain or well baked potter's ware, is used with great success in uniting the tiles upon roofs, and in cisterns and reservoirs. To form this cement the pulverized fragments are thoroughly incorporated with the heated oil, and applied by the trowel while in that state. When linseed oil is to be used in painting, one-twentieth, or, at the most, one-tenth of litharge is sufficient to render it drying.

With linseed oil and common glue, a *water-proof material* is made, which may prove of great use in preparing garments for soldiers. Immerse common glue in cold water until it becomes perfectly soft, but yet retaining its original form; after which it is to be dissolved in common raw linseed oil, assisted by a gentle heat, until it becomes entirely taken up by the latter; after which it may be applied to substances for adhesion to each other, in the way common glue is usually applied. It dries almost immediately, and water will exert no action upon it. It has more tenacity than common glue, and becomes impervious

to water. It may be used also for furniture, and two layers of cloth may be glued together to form a water-proof garment. Glue dissolved in vinegar also makes a very tenacious substance in place of the prepared glues. See plates of machinery for pressing linseed and other oils, Ure's Dictionary of Arts, article "Oils;" also Wilson's Rural Cyc., articles "Flax" and "Linseed." The processes are described, with plates. Those interested may find there a full statement of the method of gathering, planting, uses, etc. See, also, "Olea," in this work. Flaxseed intended for planting should not be gathered too quickly. It is sown early in the spring. If raised merely for the seed, it is harvested and threshed like other grain. But when the stalk is used, it is pulled up by a machine as soon as the seed begins to ripen, and bound in small bundles, the seed stripped off by a machine, and the stalks spread out and dew rotted; it is then sold to the hemp makers for seven or eight dollars per ton. The farmer sells the crop at one dollar per bushel for the seed, which is sent to the oil-mill.

Popular Essays on the cultivation of Flaxseed and Castor Oil Beans have been published, 1868, by the St. Louis "Lead and Oil Company." Barnum & Brother, of St. Louis, furnish machinery. They say that "farmers can undertake their culture with an almost absolute certainty of obtaining high prices, and of being richly rewarded for their labor," and that their cultivation in the Southern States may be made more remunerative than in the Northern States, where, as in that of New York particularly, they have been profitably cultivated for years. On account of the importance of the subject, I introduce the following from the pamphlet:

"Millions are annually paid to foreign nations for flaxseed (or linseed) and castor beans, and for the oil pressed from them. It is strange that this country should be the importer of articles which can be so easily produced by our own people, and which are so perfectly adapted to our soil and climate. We might, with the same propriety, neglect to raise enough wheat or corn for our own consumption, and thus be compelled to depend upon foreign nations for our supply of these articles; for we maintain that these crops can be raised at a greater average profit than wheat or corn.

"The cultivation of flaxseed is as simple as that of any crop

we have. It requires no more labor to raise and harvest a crop of it than it does to raise and harvest a crop of oats, barley or wheat. It is less exhausting to the soil than a crop of wheat. The use of mowers in harvesting, leaving the roots in the ground, prevents the crop from being an exhausting one. Flax is a very quick crop. The producer can receive his money within three months after sowing. The following directions, if followed, will enable any farmer to raise a large crop of strictly prime seed:

"*Selection of Soil.*—Almost any dry, rolling, moderately rich land will produce good seed. It is generally thought that flax-seed should be sown on moist, rich land, such as our creek and river bottoms. This opinion prevails because the straw of flax grows more luxuriantly on such land. The best seed, *i. e.*, richest in oleaginous matter, is produced upon rather dry, rolling and only moderately fertile soil. The stalks are shorter, branch more, and the bolls fill better. A better quality of seed is also obtained in a dry season than in a wet one, *i. e.*, the seed contains a better per cent. of oil. The straw does not grow so rank, and the bolls fill with larger, richer seed.

"*Preparation of the Soil.*—The soil should be put in the finest possible tilth for the reception of the seed. One good, deep plowing, and several harrowings, so as to make the surface fine and smooth, will answer. But it is better, when it can be done, to plow the ground deeply in the fall, exposing the sub-soil to the action of the frosts and the atmosphere. In the spring, cross plow the land, and harrow as before recommended. One thing must always be borne in mind in preparing land for flaxseed, and that is, the land must not be worked when wet. If it is, it will be lumpy, sticky, and in bad condition for a crop. When the soil is dry, it pulverizes freely, and no such consequences follow. It is desirable to have a heavy roller drawn over the field, to crush and thoroughly pulverize any lumps or clods that may be on the surface. The whole cultivation of the crop, and the yield therefrom, depends upon putting the land in proper condition for the seed. A little extra labor and care in this respect will yield a rich return. If the sub-soil is a retentive clay, it is better to plow the ground in back furrows or lands, eighteen or twenty feet wide, leaving the furrows between the lands open

for the passage of water in case of heavy rains, or an undue amount of moisture.

"*Quality of Seed.*—Too much pains cannot be taken to get that which is fully matured and perfectly clean—free from all foul seeds—both to secure a good merchantable crop and to preserve the land on which it is sown from troublesome weeds. Farmers often experience great difficulty in procuring such seed, as no ordinary fanning mill will remove some of the worst enemies of the farmer and good flax. The linseed oil manufacturer who receives the crop of a large section of country is enabled to select choice lots of seed and reserve them for sowing, and then, by machinery too expensive and cumbrous for ordinary use, to clean it so thoroughly that he can give out each year an almost perfect article of sowing seed. Such seed is superior to that ordinarily obtained in the market, and even at seed stores. With good seed to sow, there is nothing like flax as a preparatory crop for wheat. The testimony of Ohio farmers, where flax has been extensively grown for over a quarter of a century, is explicit on this point.

"*Time and Manner of Sowing.*—The seed should be sown so soon in spring as the land can be got in proper condition—say the latter part of March to middle of April. We have heard that it is sometimes injured, at a particular stage of its growth, by frost; but we have cultivated it, and seen it cultivated for more than twenty-five years, and have never known any injury to occur to it from frost. To avoid frost, it should not be planted till about the first of May in the latitude of St. Louis; but if the season should be dry, the flax will not get large enough to resist the drouth of summer. Therefore, we think it better to sow the seed about the first of April. Some farmers do sow the seed as early as in February, on the snow. It may be sown with safety at almost any time in spring. The seed is scattered evenly and thinly over the surface of the ground by hand. It should be covered by drawing brush over it, instead of harrowing it, as by the latter method it is covered too deep. Only a very slight covering is required. A heavy rain, immediately after the seeding, will cover the seed sufficiently; or, drawing a heavy roller over the ground will answer the same purpose. But, in these cases, the soil must have been made very mellow and fine before sowing the seed.

"*Quantity of Seed per Acre.*—Not over half a bushel per acre, in any case, should be sown. By thin sowing the stalks will be stronger and throw out vigorous branches, which will produce large bolls filled with plump, glossy seed, containing a very large per cent. of oil. By thick seeding the plants are less strong, branch but little, the sun can strike only the tops of the plants, and the seeds will be smaller, lighter, and will not contain within fifteen or twenty per cent. the amount of oil that seed will when raised by thin sowing.

"*Flaxseed with Barley.*—Flaxseed may be raised with spring barley with the most satisfactory results. A yield has been obtained, varying in different years, from ten to fifteen bushels of flaxseed, and from sixteen to twenty-two bushels of barley per acre. The barley is first sown and harrowed in, then the flaxseed is sown, six or eight quarts per acre, and covered with the brush. The crops ripen nearly together. They are harvested, and then threshed with a common threshing machine; and by the use of suitable screens in the fanning mill, the barley comes out clean in the front part of the mill, and the flaxseed comes out under or at one side of the mill. We have seen as fine, plump flaxseed raised in this manner as we ever saw, and the barley equally fine. Those farmers who intend to sow barley, will find that, by sowing flaxseed with it, they will derive much greater returns from the flaxseed than from the barley, and the quantity of barley produced will not be materially lessened. Less than the usual quantity of barley should be sown, when it is intended to raise flaxseed with it.

"*Time of Cutting.*—Flax should be cut as soon as the bolls begin to turn brown, and while the stock is yet green. If left standing too long, there will be a great loss of seed in harvesting. Farmers are usually well through harvesting spring wheat before flax is ready to cut; and it ripens considerably later than winter wheat.

"*Mode of Cutting.*—Some farmers use a cradle, but a large majority a machine. From the number of reapers mentioned as working well, we are persuaded that almost all our standard machines can be used to advantage in cutting flax. When it is raised principally for the seed there is no necessity for binding it, but may be simply raked off into gavels and lie until dry, when it is ready for threshing. It is better to thresh it early.

"*Mode of Threshing.*—Some use a flail, some a machine, and some tread out with horses. In some sections, and those where they have raised most, and for the longest time, they report no difficulty in using machines with some slight alterations, to suit better the nature of the crop. The good sense and peculiar circumstances of each farmer will suggest the best mode for him.

"*Cleaning Seed.*—Is an item in raising flax that must have great attention from farmers. Until lately the makers of fanning mills had little or no experience with it, and so furnished no screens suitable; but now several furnish a flax screen, with which a large amount of the foul seeds can be removed; and there is certainly no excuse for transporting dirt, at a high rate of freight, to the damaging of the crop in the market, and the great annoyance of the manufacturer, who has to separate every particle of it before crushing the seed. The difference in price between lots of seed belonging to different parties is mainly determined by the manner in which it has been cleaned by the farmer.

"*Yield per Acre.*—The average yield of seed may be stated at ten to twelve bushels per acre. The largest yield of which we have heard was twenty-three bushels to the acre, but scores of farmers report fifteen to twenty bushels. The average yield of straw is one and a half to two and a half tons—when cut, yielding about one ton of rotted straw for which there is now an active demand with every prospect for its increase, as machines for breaking out the fibre are improved and multiplied.

"*Cost of Production.*—About the same as wheat. Harvesting less expensive, but cleaning a trifle more. So that it may be safely put down as costing less to raise flax than wheat.

"*Certainty of the Crop.*—On this point there is perfect agreement from all sections. We hope farmers, who have hitherto stood aloof from its culture, will give it at least a fair trial—fully persuaded that, at no distant day, the South and West can and will produce flaxseed enough to supply the whole country with linseed oil, and flax fibre enough to clothe us all in linen more or less fine, and that at a cost comparing favorably with cotton.

"Flaxseed has proved a profitable crop in the Northern States for several years. The importation of linseed and linseed oil

has exceeded manyfold the home production; and the present duty on foreign oil and seed, with the immense home demand, is a sufficient guarantee to the producer of remunerative prices for many years to come. The market price for flaxseed has ruled remarkably regular the past few years, as a comparison of the highest and lowest prices for tho four years last passed will show:

	Highest Price.	Lowest Price.
1864	$2 75	$2 25
1865	2 85	1 70
1866	2 75	2 50
1867	2 50	2 00

The highest prices for the four years averaging $2 71, and the lowest $2 11 per bushel. The fibre, when properly rotted and broken, is saleable in large quantities in the principal cities, at from eight to twelve cents per pound."

The reader interested in the preparation and cleaning of the fibres of textile plants, will find a paper upon the subject, condensed from the Singapore Free Press, in the P. Office Rep. 1854, p. 174. A description of the simplest and most economical modes of cleaning them is given. The Plantain, Agave and Aloe are planted in India, and the fibre exported for twine, paper, etc., bringing from sixty to two hundred dollars per ton. I do not know that these plants are used in our West India islands or in Florida for these purposes. The ordinary mill used in pressing sugar cane can be used in cleaning the fibre. See article cited, and "Ramie" in this volume.

Wilson's Rural Cyc., article "Bleaching," furnishes a practical explanation of the methods of bleaching flax, hemp, etc. See, also, Ure's Dictionary. The wild flax (*L. Virginianum*, L.) grows in Florida and northward.

MALVACEÆ. (*The Mallow Tribe.*)

They abound in mucilage, and are totally destitute of all unwholesome qualities.

LOW MALLOWS, (*Malva rotundifolia*, L.) Naturalized; grows around buildings; Richland; vicinity of Charleston; N. C. Fl. June.

U. S. Disp. 444. A substitute for *M. sylvestris*, which possesses valuable demulcent properties. Woodv. Med. Bot. 554, tom.

197. It is very emollient, and is employed in catarrhal, dysenteric and nephritic diseases, and wherever a mucilaginous fluid is required. It is administered in the shape of emollient enemata, and it forms a good suppurative or relaxing cataplasm in external inflammations. Mér. and de L. Dict. de M. Méd. ii, 207. It was highly regarded by the ancients. "Pythagore regardait leur usage comme propre à favoriser l'exerçise de la pensée!" Hippocrates employed it as we do, for gargles and collyria, as an application to heated and inflamed parts, as a vehicle for pectoral and anodyne medicines,. and for those administered in diseases of the urinary passages. The root, seeds and whole plant are mucilaginous, and are employed in catarrhal, dysenteric and nephritic complaints as an emollient injection, and wherever an emollient substance is required. U. S. Disp. I have seen it collected in Charleston for these purposes.

INDIAN MALLOWS; VELVET LEAF, (*Abutilon Avicennæ*, Gærtn., T. and G.) (*Sida abutilon*, Linn. and Ell. Sk.) Grows at Granby, in Richland District, and in Georgia; vicinity of Charleston. Bach. Newbern. Fl. July.

Lind. Nat. Syst. Bot. 96; Mér. and de L. Dict. de M. Méd. vi, 338. The plant is said to be cultivated in China as a substitute for hemp. The flowers are employed as an ingredient in emollient applications.

Abutilon and Sida. Species of these two genera have been used in medicine. *S. abutilon* is cultivated in India for the fibre, and somewhat extensively introduced into field culture in Italy. See Rural Cyc., Chap. So. Flora. Our *Abutilons* should be examined; several grow in South Carolina and Florida. They all furnish mucilage and may be used as substitutes for the Marsh mallow.

MARSH MALLOW, (*Hibiscus Moscheutos*, L.) Collected in St. John's; vicinity of Charleston; Newbern.

Bergius, M. Med. ii, 629. This also is possessed of demulcent properties; a convenient substitute for the above.

OKRA, (*Hibiscus esculentus.*) Introduced from Africa.

The fruit and pods afford the well known valuable vegetable so largely used in the Southern States in combination with tomatoes in making soup. It is very mucilaginous, and, in-

fused in water, forms a suitable vehicle for medicines prescribed in diseases of the mucous passages, for enemata, etc. The leaves are sometimes employed for preparing emollient poultices. The roots are said to abound in mucilage, of which they yield twice as much as the Althæa root, free from any unpleasant odor. Their powder is perfectly white and superior also to that of the Marsh mallow. See Am. J. Pharm., May, 1860, U. S. Dis., 12th Ed. The parched seeds afford a tolerably good substitute for coffee; the difference can with difficulty be detected. It has for some time been used for this purpose among the negroes on the plantations of South Carolina.

This well-known vegetable contains an enormous amount of albumen—so much, that Chaptal says that in St. Domingo it is employed in clarifying liquors. In Guadeloupe and Martinique they use the bark of the slippery elm for this purpose as white of egg elsewhere. It would be a matter of importance to ascertain whether or not vegetable albumen would be useful in clarifying sugar. In employing albumen for clarifying fluids the following method is adopted, according to the writer just mentioned. I would refer the reader also to Ure's Dictionary of Arts and Manufactures. The albumen, generally white of egg, is diluted with water, and then mixed with the liquid which is to be clarified; the whole is then heated to 65° or 70° Fahr., and stirred carefully so as to distribute the albumen equally among all its particles; by increasing the heat the albumen is made to coagulate, when it rises to the top of the vessel, carrying with it all the particles which render the liquid turbid or cloudy; the thick foam which this produces, when cooled, may be taken off with a skimmer, and the liquid be afterward filtrated, to remove any remaining particles from it. The same writer says that animal albumen, mixed with quick-lime, finely powdered and spread upon strips of linen, makes an excellent lute, to be applied over the joints of vessels for distilling, to prevent loss of gas or vapor.

The Bené, (*Sesamum indicum,*) is another plant cultivated on our plantations, which has a very large amount of mucilage.

The okra plant has been recommended to be planted for the fibre as a textile substance. Even the cotton plant, if not allowed to come to maturity, and planted closer, like flax and hemp, might furnish an inner bark suitable for twine or cloth.

The nettle, (*Urtica dioica,*) the *Apocynum cannabinum*, and several species of Asclepias, or silk weed, may, by improved cultivation, give a useful fibre; see index. Dr. G. C. Shaeffer, the author of a paper in P. O. Rep., 373, 1859, on "Vegetable fibre," states that the fibre of the silk or milk-weed (*A. cornuti*) "was nearly if not quite as strong as the hemp." In this article the mode of preparing textile fibres is treated of, and also the best materials for paper making. A curious work, by Dr. J. C. Shaeffer, 1765, is referred to, in which experiments were long since performed upon innumerable substances suited to the making of paper. The latest work of consequence has been published by L. Piette, 1838. Piette gives specimens of good, strong, white paper made from straw. Paper in the United States was also made from wood, sawdust and shavings, in 1828 and 1830. The bark of the linden is used in Prussia. (See *Tilia.*) The palmetto, agave and yucca of the South furnish a long fibre. When necessary, the intercellular substance may be dissolved out by strong alkalies by the lye from the ashes of plants, etc. For material for paper making see "Cotton" and "Esparto" Grass. Ure's Dictionary of Arts may be consulted with reference to machinery, etc.

COTTON, (*Gossypium herbaceum*, Linn.)

A native of tropical America. The long staple, including the varieties of sea island, black seed and mains, grow best in the lower country, and the short, or green seed, in the upper districts. Prescott states that the Spaniards found it in Mexico. See "Conquest of Mexico." It was first planted in the United States as an experiment in 1621. It was known in South Carolina by a paper which refers to it, dated 1666, but only seven bags were exported in 1748.

Mér and de L. Dict. de M. Méd. Supplem. 1846. This was the plant known to the ancients as the Byssus of old writers. Herodotus, t. iii, 134, of Durger's Ed.; Chateaubriand, Journal to Jerusalem, 1777. See Révue Médicale, Feb. 1845, 225, for Observations on the Employment of the Cotton Fibre in Dressing Wounds; Ann de Chimie, 427, 1845; Bindl's Letters on the Cultivation of Cotton in India; C. Delasterie on the G. herbacea and its Cultivation, Paris, 1808; Lessier sur la Culture du Coton en France; Gerspach, Considérations sur l'influence des

filatures du Coton sur la santé des ouvriers, Paris, 1827; Obs. on the Employment of Cotton in the Treatment of Blisters, 1830; Some Reflections by F. T. Saint Hilaire on Wounds, and their Treatment with Cotton, (in French,) Montp. 1830; Sicand, Obs. on the Employment of the Cotton Fibre in Surgery and a Memoir on the different Species cultivated in Naples, op. cit. sup.; Griffith, Med. Bot. 163; Dr. MacFayden (Fl. Jamaica) considers the species only as varieties. Humboldt saw them growing in Central America at an elevation of nine thousand feet. The flowers are emollient like mallows and used for similar purposes; the roots are used in India in diseases of the urinary organs. See Anslie. In Brazil, a decoction of the leaves steeped in vinegar is said to relieve hemicrania. According to Martin the seeds, which afford much oil, are emollient and are employed in emulsions, injections and diseases of the mucous passages. The oil is afforded by the seeds in sufficiently large quantities to be exported. It might be made a useful article on the plantations, as it does not deprive the seeds of their valuable properties as a manure. When boiled, they furnish an excellent food for cattle, but are poisonous to hogs when eaten in the raw state. Much use is made of the roots in South Carolina in the treatment of asthma—a decoction being employed. It appears to have, moreover, a specific action on the uterine organs. Dr. Ready, of Edgefield District, informs me (1849) that his attention was called to its emmenagogue properties by an article which appeared in a journal published some years since. (New Orleans Med. Journal.) He has since used it in suppression of the menses, but more particularly in many cases of flooding, with entire success. It seems to produce as active contractions of the uterus as ergot itself. Four ounces of the root or inner bark of the root are infused in one pint of boiling water, of which from three to four ounces are taken internally every fifteen minutes. More extended experiments with this remarkable plant, in cases of this description, might furnish very valuable results, and I would invite particular attention to it. Since the appearance of the first edition of this work many articles have been published in the medical journals on the use of the cotton root as an emmenagogue and parturifacient.

Dr. Wood in the 12th Ed. U. S. Disp., 1866, says that the root

of the cotton plant has been employed by Dr. Bouchelle, of Mississippi, who believes it to be an excellent emmenagogue and not inferior to ergot in promoting uterine contractions. He states that it is habitually and effectually resorted to by the slaves of the South for producing abortion; and thinks that it acts in this way without injury to the general health. To assist labor he employs a decoction made by boiling four ounces of the inner bark of the root in a quart of water to a pint, and gives a wineglassful every twenty or thirty minutes. (West. Journ. Med. and Surg. Aug. 1840.) Dr. T. J. Shaw, of Tennessee, thinks it superior in the treatment of amenorrhœa to any other agent, and equal to ergot as a parturient, while attended with less danger. He uses a tincture made by macerating eight ounces of the dried bark of the root in two pounds of diluted alcohol for two weeks, and gives a drachm three or four times a day. (Nashville Journ. Med. and Surg. 1855.) See U. S. Disp. See, also, Pe. Mat. Med. ii, 568; Med. and Surg. Journal, xiii, 215; U. S. Disp. 357; Lond. Med. Gazette, Nov. 8, 1839; West. Journal Med. and Surg. 1840; Royle, Illust. 84 and Mat. Med. 288; Mér. and de L. Dict de M. Méd. iii, 409; Marcgrave's Brazil, 60; Dict. des Sc. Nat. xxxiv, 15. Dr. Bates, Journal of Mat. Medica, May, 1867, furnishes a paper on the medical uses of the plant.

The fibre of our great staple is applicable to many purposes in surgery, in dressing burns, preserving the temperature of the extremities in depressed conditions of the system, and also for stuffing and padding in the application of fracture boxes; but it is not, as has been confidently stated, a substitute for lint in any sense of the term. On account of the oil which it contains, it cannot absorb pus or liquids from wounds, unless it has been previously prepared. This, indeed, is a peculiarity of cotton fibre in its natural state; water or fluids will roll from it; the slightest experience or observation would convince any one of this; and yet it has been extensively distributed as a substance for dressing wounds, which it only tends to render hotter and more inflamed.

The plant has also been highly recommended as a substitute for quinine in intermittent fever. I will refer the reader to some of the later volumes of the Charleston Med. Journal and Review. It has been used with great confidence by many per-

sons throughout the South and West. See, also, a paper by Dr. Cabell, in the Va. Med. Journal, vol. 3. Prof. H. R. Frost, (Charleston Med. Journal, May, 1850,) quotes Dr. W. R. Davis, of Fairfield District, S. C., who reports that it was used as an anti-periodic agent. A pint of the seeds is boiled in a quart of water to a pint, and a teacupful of the decoction is given an hour or two before the return of the chill. I introduce the following slip from a newspaper (1862) in default of more precise information from the medical authorities who have used it.

H. D. Brown, of Copiah County, Mississippi, communicates the following notice of the use of the cotton seed tea as a *substitute for quinine :*

"I beg to make public the following certain and thoroughly tried cure for ague and fever: One pint of cotton seed, two pints of water boiled down to one of tea, taken warm one hour before the expected attack. Many persons will doubtless laugh at this simple remedy, but I have tried it effectually, and unhesitatingly say it is better than quinine, and could I obtain the latter article gratuitously, I would infinitely prefer the cotton seed tea. It will not only cure invariably, but permanently, and it is not at all unpleasant to the taste."

Collodion, a solution of gun cotton in ether and alcohol, has been extensively employed in surgical cases, as a covering for wounds, to keep out the air and to assist in the approximation of the edges. It has also been employed in various eruptive diseases, in erysipelas, in burns, in the cure of excoriations and fissures of the nipple, in nævus, etc. See medical works.

I am informed by planters in South Carolina that they use habitually a decoction of the cotton seed in place of flaxseed, and wherever a mucilaginous tea is required. If it serves fully the purposes of flaxseed, the fact is highly important, and it should be largely used.

The seeds of the black seed cotton, parched and ground, are considered by many as one of the best substitutes for coffee, both in smell and taste. In a paper by G. C. Shaeffer, on the cotton fibre, Patent Office Report, Agriculture, 1854, p. 181, he says: "Still, in the present scarcity of paper making material, it may be well to look to the bark of the cotton plant as a partial supply for the common kinds of paper. Fermentation, or any of the known methods of separating the wood, may be em-

ployed." If the cotton is gathered, the plant has then become too woody. See, also, Okra. (*Hibiscus esculentus.*)

Townsend Glover, entomologist, employed by the Patent Office, describes the diseases incident to the cotton plant in his successive papers, in the volumes of the P. O. Report for 1855–'7, "On the Insects frequenting the Cotton Plant." These papers contain a good deal of information on the character and habits not only of insects infesting cotton, but many other plants, with illustrations on wood. He describes the rust, rot and blight, and devises methods for preventing their spread. The English use cotton dipped in a solution of saltpeter as a moxa; see "*Helianthus.*" "Gun cotton" is also a well known explosive agent, prepared by means of nitric acid.

Dr. Wood, in his notes to the 12th Ed. U. S. Disp., 1866, quotes some interesting facts from a paper by Mr. Wm. H. Weatherby, who resided at the South. (See Am. J. Pharm., May, 1861.) He states that the oil is obtained by expression from the seeds, previously deprived of their shells. In this state they yield two gallons of oil to the bushel. Besides the crude oil, there are three varieties in the shops at the South more or less purified, recognized as the *clarified*, the *refined* and the *winter bleached.* The last mentioned has a mild, peculiar odor, and a bland, sweetish taste, not unlike that of almond oil. The oil is used in the preparation of woollen cloth and morocco leather, and for oiling machinery. There seems to be some doubt of its drying qualities. It has been found to be an excellent substitute for almond and olive oil in most pharmaceutical preparations, but it does not answer well in the formation of the lead plaster. Citrine ointment may be prepared with it. It is unsoluble in alcohol, but dissolved in all proportions of chloroform.

Cotton Seed Soap.—The following I obtain from a correspondent: "Put cotton seed into a large and strong iron pot, in small quantities at a time, mash them well with a wooden pestle, and then pour in a certain quantity of common lye, and boil thoroughly; strain in an ordinary sieve, and proceed in the usual way in drying and cutting into cakes. The oil is thus yielded, and saponified."

Machines are now manufactured in this country for decorticating the cotton seed in manufacturing the cake. It is thus

much improved as an article of food for cattle, not being near so liable to injure the animals. It brings a high price in England. Mills for the preparation of the cake have been established in Rhode Island. Strange that nothing of the kind has existed at the South where the seed can be so easily obtained. The great value of the seed as a manure may account in part for the indifference of the planter. The seed has been pressed in New Orleans. The oil is said to be "unsurpassed for dressing leather and lubricating machinery, and as an illuminator affords a clear and brilliant light"—as good as spermaceti when refined. See, also, a paper on cotton seed oil, Southern Cultivator, p. iii, vol. 3. He states that there are thirty bushels of seed to every bale of cotton; each bale will yield at least fifteen gallons of crude oil and three hundred and sixty barrels of oil cake. "No difficulty exists in hulling, tempering, or expressing the oil," and the *huller* of Follet and Smith, of Petersburg, is referred to; hulling at the rate of a basket of kernels in four or five minutes. The machinery employed in French Flanders for rape seed, answers perfectly for cotton seed.

Cotton Seed Oil.—A good deal has been said of late in the Cincinnati and New Orleans papers on the subject of cotton seed oil and cake; and if the half of what is published shall turn out to be true, we have reached the beginning of a new era in the cotton culture, not unlike that which marked the invention of the cotton gin. Mr. William R. Free, of Cincinnati, has invented and constructed a cotton seed huller, which entirely separates the hull and the little lint that adheres to it from the meat part of the seed. The huller is said to be simple in construction, is made entirely of iron, and is easily kept in repair. It requires a two-horse power to drive it and two hands to tend it—one to feed the mill and one to remove the hulls from the screen. It will hull and screen one ton, or two thousand pounds per hour, ready for the press—fifty per cent. of which is kernels or the meats of the seed, from which forty gallons of oil may be obtained. This machine must be exceedingly valuable to prepare seed for all feeding purposes on the farm where no oil is expressed, as the hulls and lint are altogether undesirable as food. Hulls and cotton seed and cut straw, or corn stalks, boiled together in large iron boilers, or steamed in big tubs or vats, will make a superior stock feed. But as a

gallon of this oil is cheap at a dollar, and enough seed to make forty gallons can be hulled in an hour, it is far better to feed the cake after most of the oil is taken out, steamed with straw or stalks, than to feed this precious oil to live stock. After cotton seed is hulled, a good cotton press for baling cloth will press out most of the oil in the kernels. Perhaps they may require beating, as in pressing flaxseed. The art is very simple. Instead of sending cotton seed to distant markets, where the producer will lose the cake for feeding and as a fertilizer, we earnestly recommend to each large plantation (or where their operations are small, for several to unite,) to purchase a hulling machine, and, if necessary, construct or buy an oil press for home use. According to the data furnished by the Cincinnati operators, four thousand pounds of common cotton seed will turn out fifty dollars worth of oil; and every planter knows that in case he should wish to mix the hulls with the cake in feeding it, or as a manure, he can do so after the oil is expressed. The oil is nearly valueless as a fertilizer, being nothing but carbon and the elements of water, while in skilful hands it is worth some forty to fifty cents a gallon for making fat hogs, sheep, cows and steers, but more for burning, and lubricating machinery. At this time we would gladly pay twenty dollars per one thousand pounds for cotton seed cake, to feed cattle, sheep and hogs. It is worth more than corn or wheat, pound for pound, to feed mules and hogs on a cotton plantation. It contains more of the muscle, sinew and bone forming matter. It has less starch than corn, but is a healthier food than either peas, beans, wheat or maize. If the hulls were in the cake, the result would be quite different. In flaxseed cake the hull of the seed is not removed. It is owing to the richness of the clean meats of cotton seed that straw, or coarse forage of some kind, should be fed with the cake, except to hogs.

Consequent upon the increased amount of cotton raised in the Southern States, and the great bulk of the seed, there had been several establishments in operation before the war for economizing the oil. At one in New Orleans, driven by a thirty-five-horse power steampress, five hundred gallons of oil and five tons of oil cake a day were prepared. It required for the day's work, as is stated in the Southern Farmer and Planter, about fifteen tons of cotton seed to produce this amount of oil

and cake, each ton of seed yielding about forty gallons of oil and seven hundred or eight hundred pounds of cake. The proprietor shipped eight hundred tons to England, where it was used by the farmers, who are extensive importers of linseed oil cake. The cotton seed cake "is highly esteemed for fattening cattle and sheep." In Memphis, Tenn., it was also made in very large quantities. The oil, refined by a secret process, is made of two qualities—"the best used for illuminating and lubricating purposes, as well as for currying leather, etc. The inferior is found to answer the purpose of soap making equal to palm oil, making soap of every quality, even to the most refined toilet soap." Cotton seed cake might be used as a substitute to a certain extent for corn for fattening stock. "Cotton seed meal and corn meal, if applied directly to the hay that is fed in fattening animals, instead of the latter being fed alone and dry, and the corn unground, would add vastly to the profits of fattening." Cotton seed cake sold at the mills for about the same price that flaxseed cake sold for.

Browne, in his "Field Book of Manures," New York, 1853, says of the cotton seeds: "They abound in a mild oil, and are accounted very nutritious (as manures) *after the oil is expressed.* A bushel of seed weighs thirty pounds, and yields two and a half quarts of oil and twelve and a half pounds of fine meal. The oil cake is very brittle and breaks down much more readily than linseed oil cake. Its taste is not unpleasant, and it is stated that it can be employed with success in fattening stock."

In the Patent Office Report, 1855, p. 234, are some "Chemical Researches on the Seed of the Cotton Plant," by Prof. C. T. Jackson. In this article a patent is referred to as having been taken out by D. W. Mesner for "separating the hulls from the cotton seeds." The yield of the unprepared and woolly seeds is very small, in comparison with what is obtained from those which have been hulled. Analysis are given of the oil, the seed, the cake, etc. Prof. Jackson says: "*Separation of the oil:* In order to separate the fixed oil, pure ether was employed, and it was found that one hundred grains of the dried pulverized seeds yielded in one experiment 39.7, and in another 40 per cent. of pure fatty oil. By pressure, I was able with a small screw-press to obtain only thirty-three per cent. of oil;

but I have no doubt a more powerful one would have given a larger yield. The specific gravity of the oil which I obtained from the ethereal solution was 0.923—water being unity. This is also the specific gravity of purified whale oil. Cotton seed oil is stated by Dr. Wood to be a drying oil, but that which I have obtained does not appear to possess drying properties, serving perfectly well for the lubrication of machinery, and for burning in lamps, as well as for making soap. It will also serve as a substitute for olive oil in many cases, and perhaps may be eaten as a salad oil, for it has no disagreeable odor or taste."

Chemical examination of the Oil Cake.—Linseed oil cake is well known both in Europe and in this country as valuable food for cattle, and as an excellent fertilizer—worth from forty to fifty dollars per ton for the latter purpose. On examining my cotton seed oil cake, I found it possessed a sweet and agreeable flavor, and was much more pure and clean than linseed oil cake. One hundred grains of the seed leave sixty grains of oil cake. This cake, examined for sugar, was found to contain 1.1 grains, and for gum, thirty-five grains were obtained. Iodine gave no proof of the existence of any starch in cotton seed, nor in the oil cake. Alcohol dissolves out the sugar, which is like that obtained from raisins, and is grape sugar. Boiling water dissolves the gum, and becomes very mucilaginous. The gum is precipitable from the water by means of pure alcohol. On the subject of *paper* from the cotton plant, I introduce the following communication dated Carlowville, Ala., and signed C. F. Sturgis, 1863:

"Several years since I commenced experimenting with the bark of the cotton plant, (both of the root and the stalk,) and soon satisfied myself that it furnishes an admirable substitute for rags in the manufacture of paper, and is doubtless possessed of some advantages. Proceeding with my experiments, I finally invented a process (in many respects peculiar) adapted to the production of pulp from this material, visiting during the time the Bath Paper Mills and the Rock Island Mills for this purpose, as Mr. Walker, of the Bath Mills, can inform you. After a long series of annoyances, succeeded in procuring a patent from the United States Government, which is inoperative through or by reason of defective specifications, the fault either intentionally or unintentionally of my agent, at least to a degree. I, however, continued my experiments, and since the

termination of the war made application for a patent for my amended specifications.

"I am prepared to demonstrate to any intelligent body that the above named material furnishes an admirable substitute for rags in the production of Paper pulp, and that dispenses with some of the operations necessary with rags, and, therefore, will produce paper far more cheaply than rags can possibly do."

A writer in the Jackson, Miss., Southron, urges most strenuously upon the people of the South the advantages of cotton for making beds. Besides its greater cheapness, attention is called to its superior cleanliness, "vermin will not abide in it; there is no grease in it, as in hair or wool; it does not get stale or acquire an unpleasant odor as feathers often do; moths do not infest it as they do wool; it does not pack or become hard, as moss does; nor does it become dry, brittle or dusty, as do straw, hay or shucks. It is the cheapest, most comfortable and most healthy material for bedding." Cotton has been extensively used both by whites and negroes in making mattresses and comforts during the war. See "*Zostera*" and "*Ramie*" for substitutes for cotton.

It would hardly be desirable that I should furnish, in a work like this, very full instruction respecting the cultivation and handling of cotton, as it can easily be procured elsewhere. It is greatly to be hoped that manufactories will soon spring up everywhere in our midst which can use the raw material at their very doors, and thus obviously diminish our expenditures and increase our profits.

Governor W. B. Seabrook, of S. C., has written, perhaps, the most full description of the cultivation of cotton, in a pamphlet published a few years since. See, also, a paper on "Cotton" in new Am. Encyclopœdia, which contains a full account of the trade, growth, manufacture, production, etc.

Cultivation of Cotton.—With respect to the cultivation of upland or short staple cotton, I must be content to give an abstract of the plan recommended by David Dickson, of Hancock County, well known as one of the most successful planters in Georgia, and as published by him in a series of letters to Southern Cultvator, for January, 1869.

His method in brief is as follows:

Break the land deep before planting. If in a warm climate, cultivate the land flat, not on beds. At the second plowing, when the plant is about six inches high, give it a very deep plowing—sub-soil it if you can; after then cultivate with broad sweeps twenty-four inches across the wing, set to run very shallow or light harrows, so as not to break the small roots in the middle of the row, as the breaking of these roots is very fatal to cotton, causing it to shed its fruit. In a cold climate or on bottom land plant on high beds, and keep them so in cultivation, and be sure to leave a thick stand to prevent too large a weed.

His formula for manures for both corn and cotton, is "Pure dissolved bones, land plaster and salt, crowned with the best of all manures, Peruvian Guano. Purchase the pure article and do your own mixing. For one acre, take:

Peruvian Guano	100 lbs.
Dissolved bone ('sup-Phosph.) without admixture of dirt.'—Eds)	100 "
Salt	100 "
Land Plaster	50 "

all well mixed; and when you lay off cotton, open at least eight inches, and deposit the manure along the furrow and bed as usual. [For corn open eight inches, drop the manure in hills three feet apart, drop the corn within three or four inches of the manure, cover all at once, about one and a half inches deep. Let it stand for four or five weeks without work."]

The following contains an abstract of his method of cultivating a lot of sixteen acres. He gives the details of the preparation, manuring, planting, cultivation and production of a sixteen acre lot planted in cotton. As many may desire to know all the particulars, I will be as explicit as I can be in a letter:

"First, the land is good pine land, and has been under the plow nearly seventy years, and as many as fifty-five years in cotton. About twelve years ago it was sown in oats, with two hundred lbs. of guano and bones mixed with salt and plaster, and made thirty or thirty-five bushels per acre; all fed off by turning stock in the field. Four years ago I left it uncultivated until the middle of July—there was then a heavy growth of weeds on it, just grown. I turned them in and dropped peas

in every third furrow. The result was a large crop of vines and at least fifteen bushels of peas per acre. These were fed off by beef cattle.

"That, if you call *it* rest, is all the field ever had. The cotton was planted on the top of a level ridge. It was planted in cotton in 1866—manured with about one hundred and fifty lbs. of bones and Peruvian guano each, and one hundred lbs. of plaster. I commenced the 3d day of May with two horses, to prepare the land, cotton rows four feet apart; ran two furrows in the middle of each row, which stood open about eight inches deep, and applied to each acre two hundred and fifty lbs. soluble bones, one hundred and sixty-five lbs. No. 1 Peruvian guano and one hundred lbs. plaster. Salt being too high, I omitted that. The mixture was deposited in the bottom of the furrow, then covered with a long scooter plow, going about as deep as the other two furrows, then ran on the side of each scooter furrow with a good turning plow, going seven inches deep. After preparing about six acres in this way, I opened with a small bull-tongue plow; dropped the seed and covered lightly with a board—part of it with a harrow. I continued in this way until the lot was planted, finishing the 15th of May. The land being freshly prepared and a little dry, it did not come up well. The 25th of May, had a fine shower, and on the first morning of June there was a first rate stand. About the first of June I turned the plows back to finish the preparation, running a scooter (six?) inches long in the bottom of each turn plow furrow, going seven inches deeper; then ploughed up the old stalks with a large, long shovel plow, going under the old cotton stalks—making nine furrows to the row in preparing the land—taking nine days, with one horse, for every eight acres, which was equal to a full sub-soiling. The preparation was not expensive. Including planting, it was eleven days work to eight acres.

"The cotton soon stretched up well. The first plowing was done with a heavy twenty-two inch sweep, (right wing towards the end nearly flat; the back edge of the wing about one and a fourth of an inch above the front edge in elevation.) I then hoed out to a stand, the width of No. 2 Scovell hoe, leaving one to three stalks in a hill. Cotton standing thick in the drill will be much forwarder than that which is thin. Give it the necessary distance between the rows.

"The second plowing was done with the same kind of sweep, with both wings elevated—the second and last hoeing followed in a few days. The third plowing ran one furrow in the middle of the rows. The cultivation with the plow occupied one horse five days for each eight acres, which makes two days plowing for each acre, and about two days hoeing for the same.

"The cotton grew so rapidly it did not need any more work. The lot averaged about (3,000) three thousand lbs. per acre, but owing to a storm and other causes, I gathered only (2,700) twenty-seven hundred lbs. and a fraction, which will make two good bales per acre. I picked one hundred bolls in two separate parts of the lot, at four o'clock in the evening of a dry day. Each weighed twenty-one ounces. In the lot was an Irish potato patch that had been manured and mulched with straw twice. I think that portion made at the rate of six thousand lbs. per acre. The next best place was about one acre of old pine field, first year, which made, I think, about five thousand lbs.

"If you expect such results, you must not cut the roots of the cotton. Cotton is a sun plant, as you will see by its turning its leaves to the sun, as the latter moves through the heavens. So have a deep water furrow in the spring, work flat by hot weather, and on level land run the rows north and south.

"The cotton would have been much better planted the 10th of April.

"I found, during the wet weather, where the most manure was put it stood the best—especially the part that had the most Peruvian guano on it. There was some rot, owing to the density of foliage and wet weather; some boll worm and caterpillar on about one-half of the patch. The seed planted was of the David Dickson, Oxford, Ga., variety, selected twice by myself, and would sell for more than the cotton if I did not wish to plant them myself."

David Dickson, of Oxford, by his selections, has greatly improved the quality and productiveness of this variety of cotton. Mr. Peabody, on the contrary, has hybridized the "uplands" on fine sea island cotton, and has reached what is esteemed by him a most valuable class of cotton.

At my request, Mr. J. W. R. Pope, of Bluffton, S. C., has drawn out the following account of the Cultivation* of the Sea Island or Long Staple variety of cotton. Though his experience is not as great as that of some others, he has made one hundred and fifty pounds round of fine cotton to the acre, using manures made on the farm.

The sea island cotton is the plant which has been so carefully cultivated since the abandonment of indigo along the shores of Carolina and Georgia, and more recently introduced into Florida.

This plant was first cultivated on the Island of Hilton Head, by Mr. William Elliott, some sixty years or more ago. This variety of cotton affords the finest vegetable fibre known, its silky staple reaching over two inches in length. The selection of this cotton has so far improved its quality, that the seed of the most valued kinds have commanded one hundred dollars per bushel in gold. The finest quality of this cotton has commanded in market as high as seventy to ninety cents in gold before the war, and has sold during the present season at two dollars per lb. in currency. The most prominent selectors of this cotton, beginning with Mr. Kinsey Burden, are Joseph D. Edings, Joseph J. Pope, Ephraim Seabrook, J. Jenkins Mikell, John F. Townsend, William G. Baynard, William Edings, Theodore Becket, Ephraim Clarke, Owens, Benjamin Godley, William Fripp—the two last confining themselves chiefly to selecting for more productive varieties.

This plant requires, on the whole, a nicer cultivation than the uplands.

Previous to emancipation the sea island fields were cultivated by "listing" down the old beds of the fallow land into the alleys. This was done exclusively with the hoe. Manures were applied either above or below this list, according to the fancy of the planter, the pressure of the manure in the field at time of "listing, or the character of the soil.

This work being carefully done, the land was then bedded, or hilled up with the hoe, either with or without the plow, according to the wish of the planter, the strength of his laboring

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*Peter Gaillard on the Santee, in Berkeley Parish, S. C., carried the culture of this cotton to perfection very soon after its introduction. His method has been published.

force or team. With the early and further crops, in the meantime, it usually required from the 1st to 15th February, up to 1st or 18th April, to complete the fields for planting, much of this time being consumed in hauling out and distributing manures on the field. The most approved time of planting was from the 6th to 15th April.

The distance in planting was from under one foot to three feet and over, on rows averaging five feet or less apart, according to strength of soil and manures applied.

The plants along the rows range from under one foot to two feet and more, according to strength of soil and growth of cotton. The most approved plan of planting consisted of from five to six seeds to the hill. These plants were afterwards thinned down to one or two plants to the hill—the more careful and judicious planters leaving but one stalk. The first working after the plant gets up for eight days or more, is a nice hoeing, when the bunches of young plants "are slacked" by carefully drawing out a portion of the same.

The next working is what is called a "hauling," or hilling up to the cotton, when the plants are reduced to two or three in the hill. Another "hoeing" or "hauling" is then given, when the plants are reduced to a "stand," or the number of stalks deemed proper to the row. The crop is then hoed or hauled, according to condition of the field, to the end of the season, it being deemed advisable to have the two last workings, at least the last, done by "hauling." The plow, in the meantime, is used or not, as the preference of the planter or circumstances may require. These fields were formerly thoroughly and beautifully attended with the hoe alone, and checkered with narrow paths a quarter of an acre apart, presented the appearance of a well kept farm garden.

The last working was given from the 5th to 20th July. The sea island planters enriched their lands with marsh cane, and usually made their own manures, consisting of composts made of salt weeds or marsh grass, salt muck, leaves, drifted "marsh sedge" or dead marsh grass, washed in heaps on the shores, mixed sparsely with cotton seed strewn on the different layers; the whole drenched with sea water and soiled by cattle, each layer being strewed over with salt muck until the bed was completed. Stable manures were freely used and the fields soiled by running over them shifting pens of cattle.

The green salt marsh was also freely used, being cut in the summer and fall for next year's use.

This cotton is prepared for market by what is known as the McCarthy Gin, propelled either by steam or horse power. This gin is of more recent use. A few years ago the whole sea island crop was ginned out on treddle roller gins.

The cultivation now pursued with this variety approximates more nearly the upland method, and with a moderate use of the hoe, the recurrence to manures formerly practiced, and the free use of approved mercantile manures, it is confidently hoped that these once beautiful fields will again gladden our genial shores.

See P. O. Rep., 1857, and Tuomey's Geol. of S. C. for analysis of cotton plant, fibre and soil, by Prof. C. T. Jackson and C. W. Shepard.

The germinating power of some seeds reaches from one to forty years; that of the cotton may germinate after being kept three years. See paper on vitality of seeds, and then packing for transportation in P. O. Rep., 1857.

OSAGE ORANGE; *Bois d'arc*, (*Maclura aurantiaca;*) N. America. Not included by Chapman in his Flora of the Southern United States; position irregular; it is allied to the Mulberry *morus*.

From the P. O. Report, 1848, is an article taken from the Prairie Farmer, by Prof. J. B. Turner. He says that the osage orange, the favorite hedge plant of the United States, has already become too well known to need any particular description. It grows in the wilds of North America, in regions further north than New York and further south than the Carolinas. It is usually in this country from ten to fifteen feet in height, though, like the English thorn, it is said sometimes to attain in its native soil a height of fifty and even sixty feet. Its utility as a hedge plant is no longer an experiment. Hedges of the rarest beauty and excellence have been growing in Boston, Philadelphia and Cincinnati, in Kentucky, Tennessee and Northern Missouri; and, in short, in all the Middle and Southern States. Some of these hedges have been standing for ten or twelve years; they were planted by gentlemen of wealth and taste around their favorite walks and grounds at a time when the plants sold at the rate of five dollars per thousand. Among all who have written on

the subject, no unfavorable account has come to my knowledge. Great losses have been incurred with the seed, as might be expected, but the plant and hedge are universally admired and commended, and it is confidently believed by the best judges that it will double the real value of any farm it surrounds. Recent writers enumerate thus its many advantages: First, its tenacity of life is scarcely equalled; it is a native of the prairies and will grow on any soil where common prairie grass will grow. Overflowing the land does not harm it. It will live for weeks and months entirely under water. The dead wood is exceedingly hard and durable, and fresh shoots from the stumps soon supply the place of all which have been killed by fire or cutting. Second, its protection is perfect. It is armed with a very sharp, stout thorn under each leaf. Its dense iron branches soon become so interlocked, that no domestic animal, and not even a common bird, can pass through it. Both its thorns and its acrid bitter juice prevent all animals from browsing or feeding on its branches. Its seed is like the orange, and its roots like the hickory, consequently it can never spread into the field, either from the seed or root, but keeps its own place, growing stronger and thicker year by year. It thus perfectly secures orchards, fruit yards, stables, sheepfolds and pasture grounds from all thieves, dogs, wolves, etc., and one good gate, well locked, makes a whole farm secure from all intruders of whatever description. It may be trained so high as to afford shelter to stock, and break off the rough prairie winds from all grounds needing such protection. Plants may also be prepared so that it can be set in the open prairie without fence with perfect success. See, also, in Patent Office Report, 1854, p. 419, an article on the best mode of cultivating the osage orange for hedges, and the volume for 1855, p. 315, on "Live fences." The insects which feed on it are described, viz: a "chinch-bug," and the mole known as the gopher in southern Illinois. In Illinois contractors set and tend the hedge at one dollar a mile, till a good fence is produced. The juice of the osage orange, says Wilson, is exceedingly abundant, and flows freely from incisions, and quickly separates into a feculant matter, and a supernatant, clear liquid. The wood is uncommonly fine and elastic, and is used by the American Indians for making their bows. It seems well adapted to many purposes of turners. It

is said to equal fustic as a yellow dye stuff, and may be much more easily produced. Rural Cyclopœdia.

The Cherokee rose forms a most valuable hedge plant. A writer praises highly the "cabbage tree." See, also, Crab apple, (*Cratægus*,) and Wild Orange, (*Cerasus Carolin.*,) in this volume.

TILIACEÆ. (*The Linden Tribe.*)

They all have a mucilaginous, wholesome juice.

LIME TREE; BASS WOOD, } *Tilia Americana*, Linn., T. and G. *Tilia glabra*, Vent. and Ell. Sk. An ornamental tree, found in the mountain valleys from Florida to North Carolina; Newbern.

Ell. Bot. 22. The bark, when macerated, forms a strong cordage, used for domestic purposes. The wood is white and soft, and is used by carriage and cabinet-makers.

The inner bark of the European linden, (*T. Europea*,) forms a strong cordage. Doubtless our American species are also thus distinguished. Mills, in his Statistics of S. C., states that the inner bark of the *Tilia Americana*, macerated in water, may be made into ropes and fishing nets, and is a good application to burns. The plants or branches may be steeped in water for three months, dried and stripped; for every purpose of cordage on the plantation or garden, this material will be found useful. It forms throughout England the material for "bass," and is used by the horticulturist. The flowers of our American *Tilia*, sent to me from Pendleton District, S. C., I find quite as useful as the imported "*Tilleul*," a material for quieting, anti-spasmodic teas, which I have repeatedly seen prescribed in France. It is particularly grateful and soothing to lying-in women: quieting nervous excitement, and pleasant to the taste. I would particularly recommend a larger use of these flowers in the Southern States. It can be used wherever a tea is required. The above remarks apply to *T. pubescens* also, which is indigenous. The wood of the *T. Americana* is white and soft. In the Northern States, where the tulip poplar does not grow, it is used for carved work for the panels of carriage bodies and the seats of Windsor chairs. It is, however, apt to split, and is not considered equal to poplar for such and other useful purposes. N. Am. Sylva.

"Honey-dew" is generally found most abundant on the Lime, Sycamore and Beech trees. I have noticed it on the Cotton plant, and at times it covers the leaves of the Potato, Rye, Wheat, etc.

It is, by some, supposed to be connected with the potato disease, though it abounds in swampy places. Heywood says "it is owing to an excess of carbon in the plants," which could only occur in dry weather, when the other ingredients could not be furnished for it to combine with. I insert here an extract from the Analectic Mag., Philad., 1815:

"My design in this essay is to give a brief statement of certain facts relative to the appearance of the honey-dew in Carolina, which appear to militate against the received theories of its formation; together with a concise view of the opinions of ancient and modern writers with regard to this peculiar substance.

"The production of honey-dew is influenced by the season of the year, evidently by the state of the atmosphere. In Carolina it most frequently appears in the month of May or June, during a long absence of rain, and after a succession of warm days, alternating with cool nights. Early in the morning it is found on the leaves of plants, grapes, etc., of the consistency of diluted honey, transparent, and resembling in taste the syrup of refined sugar; the viscidity of it increases with the heat of the sun; and about ten or eleven o'clock it ceases to be fluid, giving to the leaves a shining and glossy appearance. Situations, also, appear to influence the production of the honey-dew. I have observed it in the greatest abundance near the margin of stagnant marshes, ponds and savannahs. In the District of Marion, South Carolina, is a morass extending fifteen or sixteen miles in length, and one or two in breadth; it contains no trees of considerable magnitude, except the cypress and a few perennial shrubs, but abounds with annual succulent aquatic plants and grapes. Near the edge of this morass, during the season and state of the atmosphere alluded to, the honey-dew is produced in such quantities as to moisten every shrub, and to cover the grass. Horses, which feed at large in the vicinity of the morass, may be found at eight or nine o'clock in the morning with their manes and tails agglutinated to a mass with this substance. The particles of pine leaves and grasses carbonated by the fires

which sometimes ravage extensive tracts of country in March and April, are frequently observed cemented with large masses, and in situations where, apparently, the honey-dew could not have dropped from overshadowing trees. Swarms of bees inhabit almost every excavated tree; and from their honey the poor inhabitants of this sterile region derive no inconsiderable support.

"Fenega, in his history of California, says that Father Piccola observes that in the months of April, May and June, there falls with the dew a kind of manna, which becomes inspissated on the leaves of trees. He adds that he tasted it, and, though not so white as sugar, it had all the sweetness of it."

CAMELLIEÆ.

TEA PLANT, (*Thea viridis.*) The introduction of the Tea plant into the Southern States is so important that I will, at any rate, endeavor to give all suitable references to sources of information concerning its culture, preparation, etc. See a pretty full account of the history of its production in the United States in P. O. Report, 1855, p. 42. The best mode of growing the plant, drying and preparing the leaves, is also described.

For some account of the experiment in the cultivation of foreign tea in South Carolina, by Dr. Junius Smith, see P. O. Report, 1848, p. 168, and 1859, p. 6. See, also, vol. for 1857, p. 167, for article on "Practicability of the Tea Culture in the United States." A description is given of the varieties of soil and climate adapted to the growth of tea, its cultivation and preparation, with a notice of the plants set out in Washington. This communication should be read by any one who proposes entering upon the business of raising tea plants; also, vol. 1859, p. 5, *et. seq.*, containing successful experiments in Brazil. See Red-root, New Jersey tea tree, (*Ceanothus Americanus*,) as a substitute.

Among our indigenous plants, the Gardenia, (*G. pubescens* and *lasianthus*, growing from Florida to North Carolina,) belong to the same natural family, Camelliese, as the tea plant, and they should be experimented with. Our Linden tree, (*Tilia Americana*,) the flowers of which are used in making an anti-spasmodic tea, is closely related to *Gardenia* and *Thea;* so the botanical relationship and the natural properties are again sub-

stantiated. See *Tilia*. It is said that a pleasant tea can be made likewise from the Holly, (*Ilex opaca.*)

The introduction of both coffee and tea into Brazil was at first very ow, but was subsequently successful.

A writer in the "Country Gentleman" makes this statement: "A few days ago I drank a cup of real American tea, from the Chinese tea plant, of which Dr. J. P. Barrett, near New Market, S. C., has a fine shrub, about four feet high, which has borne fruit during several years. By its side was a thrifty specimen of the *Olea fragrans*, or Chinese olive, with which the tea is scented." I have seen plants of the *Thea* growing out in the open air, near Stateburg, South Carolina, which bore seeds abundantly and were very flourishing. The seeds, at first sweet to the taste, soon prove nauseous and pungent, to a great degree. It was some time before I recovered from their disagreeable effects.

In the cultivation of the tea in China, "the lower slopes of the hills are preferred, at 1,000 feet above the level of the sea. In India, from 2,000 to 6,000 feet. The best description of soil for the tea plant is a light loam, well mixed with sand, and enriched with vegetable matter, moderately moist, but neither wet nor sour. Sloping or undulating land of this kind, on which good crops of millet or Indian corn may be produced, is likely to be suitable. Any aspect will do, but east or west is preferred. The tea plant will not flourish in a wet or stagnant soil. When produced from seeds, the tea plant first flowers in the second year. The usual period of flowering is in November, and the seeds ripen the next autumn. The ground is prepared for planting by being dug or trenched in the usual ways. Manure is rarely used in tea culture in China; but where the land is poor, stable-litter and sewage of all kinds are sometimes applied indiscriminately, in moderate quantities, and a top dressing of rich loam is considered valuable. The best time to apply manure is in the spring, before the plants begin to grow, or during mild weather in winter. When the plant is about eighteen inches high the leading shoots are pinched off, and the shrub is forced to throw out laterals. Naturally, it has a tendency to grow tall and straggling, with few side shoots. * * * As the leaves used in making tea are produced yearly at the ends of the shoots, the object of this system of treatment is ap-

parent. A small crop of leaves may be gathered the third year after planting. In the eighth or tenth year, the product may be considered at its maximum. About ten pounds to an acre is produced in China the third year, sometimes three hundred pounds in the tenth year." Art. *cit. sup.*

A valuable but lengthy article on the cultivation of this plant has recently (1866) appeared in the Southern Cultivator, a standard agricultural journal published in Athens, Ga., from which I make the following extracts:

"In March, 1860, I received fifty plants from the Patent Office. I kept them in pots until February, 1861. They were then planted out five feet each way in a loose, sandy soil. They grew off very finely; in April, 1862, I made a small quantity of tea, and from that time to the present (1866) I have supplied my family with five or six pounds of tea yearly from fifty plants. The largest amount of tea produced in China, is raised in the lands lying between twenty-eight and thirty-five north latitude.

"That the plant will grow and flourish as well or even better (although an exotic) through the whole of the States bordering the Atlantic and Gulf, from North Carolina to Texas, I have not the least doubt. All the lands of Middle Georgia and the Carolinas, which are now considered of little value for corn or cotton, can be made available, and grow tea to great advantage. In Middle Georgia and other regions the cultivation of cotton will decrease from this time onward. The truth of this fact is patent to all observers.

"As before stated, I planted out tea plants in 1861. At the present time (1866) they are from six to seven feet high, each plant covering a space of seven or eight feet in diameter—so interlocking that it is with difficulty you can get between them. To estimate the quantity which one acre of land planted in tea would make, I selected a medium sized plant, and collected the leaves from it. The yield was one-fourth of a pound of tea. The number of plants to an acre, standing five feet each way, is one thousand seven hundred and sixty-four, which will make four hundred and forty-one pounds to the acre. Can we cultivate any plant that will compare with this? At fifty cents per pound it would make two hundred and twenty dollars per acre. Another very great advantage it has over all other crops is, that neither cold or heat, dry or wet, hail or winds, or insects

injure it. Whoever heard of a failure of the tea crop of China or Japan? Of the quality of the tea I have made, I can only say that connoisseurs have assured me that they prefer it to the imported. Age gives flavor to coffee—so with tea. Some that is two years old I find higher flavored than that recently made."

MELIACEÆ. (*The Bead Tree Tribe.*)

Bitter, astringent and tonic properties characterize the species of this order. Some of them are active and dangerous.

PRIDE OF INDIA; CHINA BERRY; PRIDE OF AMERICA, (*Melia Azedarach*, Linn.) Nat.; diffused; grows in the streets of Charleston and North Carolina. Fl. May.

Chap. Therap. ii, 70; Ell. Bot. 475; Mér. and de L. Dict. de M. Méd. iv, 290; U. S. Disp. 135; Royle, Mat. Med. 308; Bell's Prac. Dict. 87; Eberle, Mat. Med. 207; Frost's Elems. pt. 1; Archives Générales de Méd. xvii, 112; Lind. Nat. Syst. 102; Coxe, Am. Disp. 128. Barton considered it our most active anthelmintic. It is also a febrifuge, adapted to verminous fevers, where no worms are voided. Dict. des Drogues, par Chevallier, iii, 27. Tournon relates a case where a little girl was thrown into convulsions by eating three of the seeds. Mérat also mentions cases. Journal Gén. de Méd. xlviii, 25; Gazette de Santé, Mars, 1824. I have frequently seen them eaten by children in South Carolina, with no bad effect, though destructive, it is said, to hogs. As an anthelmintic, four ounces of the bark of the fresh root are boiled in one pint of water, till it becomes of the consistence of coffee, of which from one ounce to half an ounce may be given every two hours; it may be drunk sweetened, and should be followed by a cathartic. The dried berries, in spirits, have also been employed against ascarides, tape-worm, and verminous maladies generally. According to Thacher, the pulp of the berry, stewed in lard, is used advantageously as an ointment in scald head. The decoction of the leaves is regarded as astringent and stomachic, and Dr. Skyston says he uses it with success in hysteria. This plant is employed in Java and Persia. See Rév. Médicale, iv, 82. The tree is planted around stables, in order that horses, by eating the berries, may be prevented from having "bots." The leaves and berries of the Pride of India, packed with dried fruits, will

preserve them from insects, and will prevent moths in clothes. The leaves of the cedar are also useful for the same purpose. See *Peach* for mode of preventing injury from worms, where what I consider to be a very important suggestion is made. It is much valued in South Carolina as a shade tree, growing equally well in dry pine land residences, and in cities; during the expansion of the flowers, however, it gives out a disagreeable odor. It is easily blown down, and is not long lived. The wood is beautifully grained, and adapted for table covers, drawers, etc., never being injured by worms. A tea of the berries affects the eyesight, I am told.

A solution or decoction made with the berries of the Pride of India, (to a half bushel of the berries put into a barrel add fifteen gallons of water, and let them soak one or two days,) and sprinkled with a water-pot over the plant, will, in most cases, prevent the depredation of the black grub, or cutworm. The elder (*Sambucus canadensis*) is also said to be excellent, used in the same way. F. S. Holmes' So. Farmer. The oil from flaxseed (*Linum*) will also destroy all kinds of animals infesting quadrupeds, when rubbed into the skin.

A soap is made from the berries of the Pride of India, which is called "Poor man's soap."

The following was published in the Columbus (Ga.) Sun 1863:

China Berries for Horse and Cow Feed.—The writer has fed China berries to horses and cows for the past two seasons, and can perceive no bad effects from them—on the contrary, horses under this feed seem to improve better than when fed on corn alone. In these times of scarcity and high prices it is worth while to give this feed a trial. In my opinion a bushel of China berries are nearly, if not quite, equal to a bushel of corn. The crop is very abundant, and now, before the winter rains, is the time to gather them. I give my horses a half a bucket full of the berries, with a small feed of corn, three times a day, and I boil the seed with peas or other feed for my cows. Horses are particularly fond of the berries.

AURANTIACEÆ. (*The Orange Tribe.*)

SWEET ORANGE, (*Citrus aurantium*, W.) This well known tree is cultivated in Charleston, and grows abundantly in Beau-

fort District, on the seacoast; very productive in Florida, and coast of Georgia.

I will condense the following from Griffith: In every part of the Western States the orange tree is liable to be injured by frosts, and hence cannot be considered as a certain crop; where this is not the case it is a most prolific plant, and the quantity borne by a single tree is sometimes enormous; thus it is said that 20,000 have been gathered from one in St. Michael's, exclusive of those unfit for use, which may be calculated at 10,000 more.

The orange contains a large quantity of saccharine matter and mucilage united to an agreeable acid, and hence is wholesome, cooling and refreshing to the sick, especially in febrile and inflammatory complaints, but should be used cautiously, as it is apt to disorder the stomach and bowels. The juice of this fruit contains citric and malic acids, the super citrate of lime, mucilage, sugar and water. The rind of the sweet orange is also used as a substitute for that of the bitter species, which is the true officinal article; it yields by distillation a fragrant essential oil. The immature fruit is also employed for the purpose of making issue peas; for this purpose they are turned smooth by a lathe; they have an aromatic odor and a bitter taste, and are also employed to flavor certain cordials. According to Lebreton, they are composed of volatile oil, sulphur, fatty matter, a peculiar principle called *hesperidin*, bitter astringent matter, some traces of acids, vegetable and mineral salts, etc.

The leaves have been employed by some practitioners as a remedy in many nervous disorders, and are said to have proved beneficial in epilepsy and chorea. They are aromatic and feebly bitter, and contain a fragrant volatile oil, which is procured on distillation, principally employed by perfumers. The flowers are much more celebrated as remedial agents, in substance, but more especially in their distilled water. Orange flower water, as it is termed, has a very agreeable odor, but less powerful than that of the flowers themselves, and is in general use in Europe as an anti-spasmodic, and is considered to possess much power; its use in this country is limited, but is becoming more extended; although not endowed with the active qualities ascribed to it, it forms a very pleasant drink to

the sick, and exercises a soothing influence when the nervous system is unduly excited. An essential oil is obtained from the flowers, known as the oil of Neroli, much used as a perfume and in the manufacture of cologne and other scented waters for the toilet. See, also, Risso's elaborate work referred to by Griffith. The young shoots are regularly knotted and are much used in the manufacture of walking canes.

To obtain the fragrant essences from the fresh rinds of lemons, oranges, etc., the rinds are rubbed against large lumps of loaf sugar until the yellow rind is completely absorbed. Those parts of the sugar which are impregnated with the essence, are, from time to time, to be cut away with a knife, and put into an earthen dish. The whole being thus taken off, the sugared essence is to be closely pressed, and put by in pots, where it is to be squeezed down hard, have a bladder over the paper by which it is covered, and tied tightly up. It is at any time fit for use, and will keep for many years. Exactly in the same manner may be obtained and preserved, at the proper seasons, from the fresh roots, the essences of the rinds of bitter or sweet oranges, lemons or limes, bergamots, etc., some of which are often unattainable in a fresh state at any price. Thornton's Herbal, p. 659. By this simple means those who have, or can obtain lemons, may preserve the essence for the preparation of cooling acidulous drinks at any time. Wine may also be made from the orange. Thornton, in his medical work, gives the method as follows: Put twelve pounds of powdered sugar, with the whites of eight or ten eggs, well beaten, into six gallons of spring water, boil them three quarters of an hour; when cold, put into it six spoonsful of yeast and the juice of twelve lemons, which, being pared, must stand, with two pounds of white sugar, in a tankard, and in the morning skim off the top, and then put it into the water; add the juice and rinds of fifty oranges, but not the white or pithy parts of the rinds; let it work all together two days and two nights; then add two quarts of Rhenish or white wine, and put it into a vessel.

In P. O. Rep., 1859, p. 106, is a communication on the products of the Ionian islands and Italy. The following may be useful to those in Florida who raise the lemon in quantity: At *Agrami*, "the most considerable, and sometimes the most valu-

able portion of the fruit is *Scarto*, or that rejected as unfit for exportation, from which the essential oil contained in the rind, and the juice, or citric acid, in the pulp, are extracted. The essential oil is expressed by the hand, in a room from which the air is carefully excluded, as, owing to its highly volatile nature, the oil produced would be greatly diminished by currents of air. The skin cut from three sides of the lemon is pressed between the thumb and finger, and ten or twelve ounces may be expressed in a long day by an expert workman. The oil thus expressed is put into large receivers, whence (after remaining some days to deposit the extraneous matter that comes off with the oil) it is transferred to copper bottles for exportation."

"The juice, or citric acid, is obtained by submitting the pulp to a powerful press, which, though rustic in construction, is efficient. This is worked during the season night and day. The quantity of juice produced from one press during twenty-four hours averages 126 gallons. * * Lemon juice intended for exportation is put into well seasoned oak casks, and filled to the bung, so as entirely to exclude the air. When of a good quality, and the filling of the cask is completed, the article may be kept in a cellar or cold place for any reasonable time." Lemon juice, used for calico printing, was afterward boiled down, or evaporated, in leaden pans, over steam, to a certain consistency—the citric acid and mucilage only remaining in a highly concentrated stage. Consult Mulberry (*Morus rubra*) in this volume. See P. O. Rep., 1858, p. 257, for Mr. Glover's report on the insects feeding upon it, and a history of the tree in Florida. See, also, Ure's Dictionary of Arts, article Citric Acid. To prevent attacks of the "scale," an insect, hot water or steam is the best remedy. The Persian powder (see P. O. Rep., 1857, p. 129,) is also advised (*Pyrethrum caucasicum*)—allied to the ox-eyed daisy (*Chrysanthemum leucanthemum*) growing in the Southern States.

LEMON, (*Citrus limonum*, Risso.) Dr. Griffith gives the following account of the properties of the Lemon:

"The juice and rind are officinal. The rind has an aromatic and bitter taste, and an agreeable, fragrant odor; these properties are owing to the presence of a volatile oil and of a bitter principle. It is an aromatic stimulant, principally employed,

however, as a mere flavoring ingredient, being seldom or never administered alone. The volatile oil, oil of lemons, although carminative and diaphoretic, is more used as a perfume and to mask the taste of nauseous medicines, than as a remedial agent; some success has attended its employment as an external stimulant, especially in chronic inflammations of the eye.

"The juice owes its sourness to the presence of the citric acid it contains in combination with mucilage, extractive matter, some sugar and water. Scheele was the first chemist who obtained this acid in a pure state. The process he devised is the same now employed, that of saturating the juice with chalk, and decomposing the citrate of lime thus formed by means of sulphuric acid, when the vegetable acid is set free, and may be purified and crystallized. Citric acid thus obtained is extremely acid, but not as agreeable as the juice itself; it is, therefore, but seldom used in medicine when the latter can be procured. It is, however, largely employed in the arts.

"Lemon juice, as being one of the most grateful of the acids, is much used in the formation of refreshing drinks in febrile complaints, and also in the preparation of effervescing draughts. A mixture of this made with one scruple of the carbonate of potash, dissolved in an ounce of water and half an ounce of lemon juice, taken in a state of effervescence, is advantageously employed to lessen fever, to check vomiting, and to diminish morbid irritability of the stomach. But the juice appears to possess properties of a higher order. Whytt found that given in half ounce doses it allayed the paroxysms of hysteria, and relieved palpitation of the heart. As a preventive to scurvy, this article is well known. The crystallized citric acid has been substituted for it, though it is not equal to the juice itself. In the West Indies and South America a cataplasm of the pulp mixed with common salt, is a usual remedy for the bites of venomous reptiles."

I may refer, also, to the use of lemon juice, with olive oil, in the West Indies, in the treatment of yellow fever, and in large doses, as recommended by B. Jones and others in acute rheumatism.

LIME, (*Citrus acida.*) Cultivated in warmer regions of Southern States.

This is largely used in the preparation of citric acid. It is

[illegible] Lemon. [illegible] Shaddock [illegible] The former [illegible] preserve. [illegible]

[illegible] flowers, etc. [illegible] sweet Orange, but [illegible] that [illegible] See [illegible]

[illegible] very [illegible]. The fruit attains a great size. [illegible] make a preserve [illegible] Citron [illegible] are [illegible] are essential in [illegible] Lemon [illegible] See [illegible] and authors.

RHAMNACEÆ. *The B[illegible] T[illegible].*

NEW JERSEY TEA TREE; RED-ROOT. *Ceanothus Americanus*, L., Two varieties exist in the Southern States. [illegible] in dry pine barrens; [illegible] collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Lind. Nat. Syst. Bot. 168; Ferrein. Mat. Med. iii. 338; U. S. Disp. 1240; Ed. Bot. Med. Notes, 291; Mer. and de L. Dict. de M. Méd. ii, 165; Boston Med. and Surg. Journal, 1835. See, also, the supplement to Mér. de L. Dict. de M. Méd. 1846, 155. This plant possesses a considerable degree of astringency, and has been used in gonorrhœal discharges. It is applied by the Cherokee doctors as a wash in cancer, and may be used wherever an astringent is likely to be useful. The Indians employed it in lues venerea, preferring it to lobelia; if the case was violent, the root of the blackberry (*Rubus villosus*) was mixed with it. Stearns' Am. Herbal, 97. Referring to its anti-syphilitic powers, Ferrein says: "Elle guerit aussi en moins de quinze jours, les vénériens les plus invétorés." It is not now supposed to be endowed with any very decided virtue in this respect. Dr.

Hubbard prescribes it with advantage in the aphthous affections of infants, in malignant dysentery and in other maladies dependent upon debility; he usually combines with it a little borax. See Journal de Pharm. xxiii, 354. Mr. Tuomey, State Geologist, informs me that much use is made of it in domestic practice in Chesterfield District. An infusion of the leaves was employed during the war of independence as a substitute for tea. I have experimented with the leaves, and obtained a liquor somewhat resembling common tea, both in color and taste. It imparts to wool a fine, persistent, cinnamon, nankeen color.

The above was included in my report on the Medical Botany of South Carolina, published in 1849. Since the beginning of the recent war I called the attention of our citizens to this plant as a substitute for foreign tea, in a brief communication, having again collected and used it, and induced others to do the same. I quote from this article: "Without any desire to exaggerate, I commend the substitute. It grows abundantly in our high pine ridges. The tea, prepared from this shrub, drawn as common tea, is certainly a good substitute for indifferent black tea. Properly dried and prepared, it is aromatic and not unpleasant. I am glad to report it as an article to be used in war times in place of a high-priced commodity, which, in every respect, it resembles, if it does not equal." Dr. John Bachman, also, at a later period (1862) directed attention to the plant, stating that he had used it for two months in his own family. The leaves should be carefully dried in the shade.

CAROLINA BUCKTHORN, (*Frangola Caroliniana*, Gray.) Mills, in his Statistics of South Carolina, states of *Rhammus Carolinianus*, that a purgative syrup is prepared from the berries; and of *R. frangula*, (Blackberry bearing alder,) that the bark dyes a yellow color, and that from a quarter to half an ounce of the inner bark boiled in small beer is a sharp purge; used as a certain purgative in constipation of the bowels of cattle.

CELASTRACEÆ.

STAFF TREE, (*Celastrus scandens*, L.) Mountains of N. C. and northward.

Acridity characterizes the order, but the seeds yield an oil which is useful for a variety of purposes. The bark of this plant has considerable reputation in domestic practice as an

emetic, discutient and anti-syphilitic; it also appears to possess some narcotic powers. Riddel, in his Syn. Fl., states that it is used by the Thomsonians as a stimulating diuretic, and considered capable of removing hepatic obstructions. Griffith.

EUPHORBIACEÆ. (*The Euphorbium Tribe.*)

The general property, according to Jussieu, is an excitant principle, residing principally in the milky secretion, and proportioned in its strength to the abundance of the latter.

BOX, (*Buxus sempervirens.*) Ex.; cultivated in gardens.

Bergii, Mat. Med. ii, 799; Ed. and Vav. Mat. Méd. 512; Le. i, 244; Griffith's Med. Bot. 602. The leaves have been affirmed to be violently purgative, and are employed as a substitute for guaiacum. Dém. Elém. de Botanique, iii, 434; Bull. Plantes Vén. de France. A fetid oil is obtained from it, and the wood is prized by engravers for their blocks.

The timber-bearing box tree is planted in England from the seeds to great profit. Besides being ornamental, its timber is very valuable: It attains a great height in Turkey and Asia Minor, and the wood is used by the engraver, and for the manufacture of combs and musical and mathematical instruments. It will grow on poor lands. One species of the garden box is always dwarfish.

BALSAM BEARING CROTON, (*Croton balsamiferum.*) Willd. South Florida.

This plant, *C. maratimum*, Walt., and several other species, natives of the Southern States, should be examined on account of their alliance with *C. tiglium*, which produces croton oil. Cascarilla bark, and a dye, are obtained from the genus *Croton.* The resin known as lac is obtained from *C. lacciferum.*

CASTOR OIL PLANT; CASTOR BEAN; PALMA CHRISTI, (*Ricinus communis.*) Ex; grows luxuriantly in rich spots. This valuable plant thrives so well in the Southern States that it might be made a source of profit. On some of the plantations the seeds are boiled, and the supernatant oil given as a cathartic. It might with great advantage be more generally used. See medical authors *passim.*

It is believed by some that one variety of the castor oil bean hulls itself spontaneously. I remember no distinction of this kind mentioned in Pereira's lengthy description of the plant.

Mr. W. Toney, a writer in the Southern Field and Fireside, says "there are several varieties, all yielding castor oil, but only one kind which is self-hulling, and this is the true, genuine oil-bean." If this is so, I am not aware of it. I have only seen a large and a small seed variety, and no writer refers, so far as I am aware, to any other distinction. He says that, for the *common varieties*, some machinery, like the cotton seed huller, is necessary to decorticate them.

I have been applied to to ascertain the relative value of the small and large-seeded variety. Pereira states that the oil is equally good and abundant in each. See, also, the Dictionnaire de Mat. Médicale.

It is being planted extensively by planters for home use in the Southern States. As it is important that this plant should be largely grown, on account of its great value and enormous consumption, I will be at the trouble to insert some of the practical information at my disposal.

A brief paper can be found in the Patent Office Report, 1855, p. 27. The writer says that the Palma Christi "has proved itself well adapted to the soil and climate of the Middle and Southern States, and were its culture extended for the manufacture of castor oil, there is no doubt it would be profitable under improved methods of extracting it, and we should no longer be dependent upon other nations for a supply. At present we annually import an amount of this article exceeding in value $30,000."

Although an annual herbaceous plant in the gardens of the cooler parts of Europe and the United States, within the tropics, and the warm climates adjacent thereto, the Palma Christi becomes a tree of several years standing, often having a woody trunk of the size of a man's body, and fifteen or twenty feet high. This plant thrives best in a light, sandy loam, although it may be cultivated with success in almost any soil tolerable fertile, or in any climate or soil where Indian corn will thrive. In the cooler parts of the Union it may be planted in hills two feet by three apart, two seeds in a place, as early in the spring as the warmth of the ground and the season will admit; but in the South, where the season is longer, and the plant assumes the character of a tree, the hills should be six or seven feet in one direction, and three and a half feet in the other, receiving

one seed to a hill, covered to the depth of two inches. The culture is so simple, that it only requires to keep the plants free from weeds, with a small, flat hill to each. The only difficulty to contend with is, that in saving or harvesting the beans, the outward coats, as they become dry and elastic, fly off the plants to a considerable distance, causing the seeds to drop to the ground. In order to prevent this, it has been recommended to cut off the branches from the plants as soon as the pods begin to explode, and spread them on the floor of a close room; and after the beans and their shells have parted, to separate the husks from the seeds with a fanning-mill, as with wheat, or try the common riddle and a draught of air. The oil is obtained both by decoction and expression. The former method is performed by freeing the seeds from their husks, which are gathered upon their turning brown, and when beginning to burst open are first bruised in a mortar, afterwards tied up in a linen bag, and then thrown into a large pot with a sufficient quantity of water, and boiled until the oil has risen to the surface, when it is carefully skimmed off, strained, and preserved for use. In extensive operations, a mill should be provided, moved by the agency of animal power, water or steam, for bruising the seeds; and the other apparatus used in obtaining the oil should be of appropriate dimensions. The oil thus obtained, however, has the disadvantage of becoming rancid sooner than that procured by expression. The best mode, therefore, is to subject the seeds to a powerful hydraulic press, in a similar manner to that in which the oil is extracted from almonds and cotton seeds. The seeds yield about one-quarter of their weight in oil. The reader interested in the varieties, mode of pressure, etc., of castor oil seeds, may consult with profit Mérat and DeLens, Dict. de Mat. Méd., Pereira's Mat. Med., the U. S. Disp., and in addition the material included in this paper; also, Ure's Dict. of Arts, article "Oils," and Wilson's Rural Cyc.

I introduce the following, from an Essay on the Cultivation of Castor Beans, published, 1868, by the St. Louis Lead and Oil Company:

"The cultivation of the Castor Bean is attracting considerable attention at the present time. Heretofore it has been cultivated chiefly for the Oil for medicinal purposes, but it is now coming

largely into demand for other uses. It is being used quite extensively for lubricating, and as an excellent oil for the hair. For medicinal purposes its use is almost universal.

"*Selection of Soil.*—Almost any soil that will produce wheat or corn, will answer for the castor bean. When it can be had, a sandy loam is preferable. The soil should be dry. Wet, heavy soils are not adapted to its successful culture.

"One important fact in connection with the culture of castor beans is, that it is one of the most fertilizing crops raised. In this respect it surpasses even clover. Many farmers say, for fertilizing purposes, a crop raised upon land is worth several dollars per acre to the land, on account of the additional fertility gained by it. We have heard of landholders offering the free use of land to be planted with castor beans.

"*Preparation of the Soil.*—The ground should be put in good condition for the seed as for other crops. One thorough plowing, and three or four harrowings, with a heavy harrow, will be a sufficient preparation. Fall plowing is undoubtedly desirable, as it more fully exposes the particles of the soil to the influence of the frosts and the atmosphere, thereby pulverizing it, and preparing it better for the seed. Where a fall plowing has been bestowed upon the land, and another cross-plowing in the spring, thorough harrowing will put it in excellent condition for a heavy crop. If the soil is inclined to be wet, it should be thrown into back furrows or lands, fifteen or twenty feet in width, and the dead furrows between these lands should be kept open for draining off all surface water. This is not more necessary for the castor bean than for many other farm crops, where the land is inclined to be wet.

"*Planting the Seed.*—The ground is now laid off in rows, five or six feet apart each way, except that between every sixth and seventh row, a distance of about eight feet between the rows is left one way, to admit a horse and wagon or slide to pass, to take the beans when gathered. Hot water, somewhat below the boiling point, should be poured over the seeds, and they should remain in this water twenty-four hours before being planted. The temperature of the water will, of course, be gradually reduced to the temperature of the atmosphere. Applying the hot water once will be sufficient. If planted without this preparation, they are a great while in germinating,

many of them not making their appearance for three or four weeks. With this preparation they will soon germinate and come up regularly. Some farmers put in each hill one-half of those which have hot water poured over them, and one-half of those which have not; so that if the cutworms destroy the first that come up, a stand may be obtained from the others, which will come up a week or two later. Good, sound, plump seed should be selected for planting. A half bushel will plant eight or ten acres. Eight or ten seeds should be dropped in each hill. But one, or at most, two plants are to be left in a hill. As the cutworm is quite destructive to the plants, this number of seeds is recommended, so as to be certain of an even stand. Of course, replanting can be done; but it is better to avoid it, if possible, by planting plenty of seed. The seed should be planted as soon as all danger of frost is over. The plants are as easily destroyed by frost as our common bean, and, therefore, planting should be delayed till after the first of May.

"*After Culture.*—The cultivation of the plants consists in destroying the weeds and grass, and keeping the soil open and mellow. These objects are chiefly attained by using the horse and cultivator, or small plow, working between the rows both ways. It is also necessary to work among the plants with hoes, going over them two or three times, cutting the weeds away from the plants that cannot be reached with the plow or cultivator, and drawing a little mellow earth to the plants, gradually reducing the number to one plant in a hill, though two are occasionally left. One strong, vigorous plant, however, will produce better seeds than two, and as great a quantity. After the plant is two feet high, it is capable of taking care of itself, and grows rapidly. After heavy rains, however, it is still advisable to work between the rows with the horse cultivator, breaking up the crust that has formed on the surface of the ground, and opening and loosening the soil to derive a greater benefit from the atmosphere. It will be seen that the cultivation is as simple as that of Indian corn, or of the common navy bean.

"*Harvesting the Crop.*—About the first day of August the beans begin to ripen. They are produced in pods or husks, on spikes about eighteen inches long, and should be gathered as soon as the pods begin to turn brown, to prevent loss by their

popping out on the field, as the beans when ripe pop or burst from the pod quite a distance. They are gathered by cutting off the entire spike. Each plant has a number of these, and they are produced and ripen in succession till frost. Of course, only those exhibiting brown pods should be cut. These spikes are then thrown into a wagon or on a slide, passing through the broad rows, and hauled away to the

"*Dry Yard.*—Which is made on a piece of land near the bean field, sloping to the south, so as to get as much heat as possible from the sun to ripen the beans and cause them to burst from the husks. Then roll the ground down hard and make a fence around the yard by placing boards up against rails laid on crotched sticks or posts; though the fence is not necessary if the yard is made large enough to leave a space outside the beans of twelve or fifteen feet, as many of the beans will pop that distance; and if the fence is not built, or the space left, many of the beans will be lost in the grass or field beyond the yard.

"The spikes are occasionally turned over and exposed to the sun, until all the seeds have left the husks, when the old spikes are taken away and a new supply added. The same process is gone through with the entire crop. Great care should be taken to prevent the beans getting wet. Dirty beans command but a small price, and sprouted beans are nearly worthless. When rain is anticipated, rake the spikes into a heap and cover them with straw or plank; sweep the beans up; clean them with a fanning mill, sack them up and store in a dry place. *Do not attempt to pop them out in pots over the fire, as it renders them almost worthless.*

"After the beans begin to ripen, the field should be gone over once or twice a week till frost. In hot, dry weather, they ripen more rapidly than in cool, wet weather. Children can perform this work, and a large family of children cannot be more profitably employed than in taking care of a crop of castor beans. The work is all light. With a steady horse children might do all the work.

"Farmers who raise but a few acres of castor beans will not, of course, go to the expense of fitting up a dry house, as the yard answers the purpose; but farmers who raise fifty acres or more will save labor and expense by having a dry house for popping out the beans on the following plan:

"*Dry House.*—A common log hut or frame building may be converted into a convenient castor bean dry house by making it tight and constructing in it a drying floor, composed of narrow strips of board, carefully laid one-fourth of an inch apart, except those parts which are immediately over the stove and pipe, which should be laid close. This floor should be as near the ground as possible, but not so low as to impair the value of the building as a barn or place of storage. A window for taking in beans is made in one side of the house, two or three feet above the drying floor, and a similar opening in the first story would be very convenient. A large stove, for burning coal or wood, is set up near the front door, and the pipe, after passing to the rear *under* the drying floor and up through an opening in the same, returns again to the front, and is carried out through the roof.

"With a *large wood stove*, having a pipe of proper size, the heating power may be increased by carrying the pipe entirely around the building, three or four feet from the walls, before it passes up through the floor, and again to the rear, before going out through the roof. A damper should be placed in the pipe near the upper end to save heat and fuel.

"The opening in the floor through which the pipe passes, is three feet square, and is protected by a boxing or curb to keep the beans from falling through. The space about the stove is protected by a similar guard, and should be at least six feet square, as the front door opens into this area.

"The beans on the spikes, as they are cut from the plant, are thrown through the window upon the drying floor; and as the bolls open the beans are stirred and fall through upon the ground floor, ready to be fanned and sacked for shipping. The hulls and spikes will make good fuel.

"*Frosted Beans*—Are worth from one-half to two-thirds the price of good beans, but must never be mixed with them when sent to market, as a very few frosted beans in a lot of good will reduce the value very much, from the inability to separate them economically.

"*Yield, Price, etc.*—The yield will depend much upon the culture bestowed upon the crop, upon the season, and the care exercised in gathering and ripening the seeds. From fifteen to twenty-five bushels to the acre is an average yield. Some cultivators will raise more, others less. Farmers will do well to pay

attention to this crop, for which a certain demand exists, and at remunerating cash prices. It will pay better than raising corn, potatoes, wheat, barley, or almost any other farm produce. It is not a difficult crop to get to market—can be taken by team, or sent by river or railroad, with more profit than most crops, as the value is greater for the same quantity.

"Castor beans have also proved a profitable crop. The market price, however, has fluctuated considerably. The crop of 1865 was totally unequal to supply the demand for oil, and prices reached the extraordinary figure of $5 00 per bushel. This stimulated the production and importation of foreign oil and beans to such an extent that the crop and importations the succeeding year (1866) proved more than sufficient to supply the demand, and a small surplus was carried over to the next season. At the commencement of the harvest of 1866, the market opened at $3 50 to $4 00 per bushel, rapidly declining, however, as the extent of the crop was developed, until at one time sales were made at $1 50 per bushel, and advanced later in the season to $2 00 and $2 25. Importers of foreign oil suffered heavy losses; and where their stocks were still "in bond," they were forced to ship to Europe for a market. Prices in 1867 showed remarkable regularity, ranging from $2 00 to $2 40, with great steadiness during the season.

"For medicinal purposes only, the demand for castor oil would undoubtedly be limited; but it is the *best lubricator known*, and at competing prices with lard oil would, doubtless, supersede it in all cases where required for heavy bearings, and the demand would be nearly unlimited.

"Flaxseed or Castor Beans, for seed, can be procured at the market price, which to-day is $2 25 for Flaxseed, and $2 40 for Castor Beans.

"In more southern latitudes, circumstances would probably render it necessary to deviate from these instructions in regard to times of planting, harvesting, etc., etc., which any intelligent planter would at once discover. It is thought they are sufficiently explicit to enable any one to successfully attempt their culture."

The Oil may be extracted from the seeds, (see U. S. Disp.,) in three ways: by decoction, expression and by the agency of alcohol.

The process by decoction consists in bruising the seeds, previously deprived of their husks, and then boiling them in water. The oil rising to the surface is skimmed or strained off, and afterwards again boiled with a small quantity of water, to dissipate the acrid principle. To increase the product, it is said that the seeds are sometimes toasted. The oil is thus rendered brownish and acrid, and the same result takes place in the second boiling if care is not taken to suspend the process soon after the water is evaporated. Hence the color of the West India oil, where this method is pursued. "The oil obtained in this country is by *expression*. The following, as we have been informed, are the outlines of the process usually employed by those who prepare it on a large scale. The seeds having been thoroughly cleaned from the dust and fragments of the capsules with which they are mixed, are conveyed into a shallow iron reservoir, where they are submitted to a gentle heat, insufficient to scorch or decompose them, and not greater than can be readily borne by the hand. The object of this step is to render the oil sufficiently liquid for easy expression. The seeds are then introduced into a powerful screw-press. A whitish, oily liquid is thus obtained, which is transferred to clean iron boilers, supplied with a considerable quantity of water. The mixture is boiled for some time, and the impurities being skimmed off as they rise to the surface, a clear oil is at length left upon the top of the water—the mucilage and starch having been dissolved by this liquid, and the albumen coagulated by the heat. The latter ingredient forms a whitish layer between the oil and water. The clear oil is now carefully removed, and the process is completed by boiling it with a minute proportion of water, and continuing the application of heat till aqueous vapor ceases to rise, and till a small portion of the liquid, taken out in a vial, preserves a perfect transparency when it cools. The effect of this last operation is to clarify the oil, and to render it less irritating, by driving off the acrid, volatile matter. But much care is requisite not to push the heat too far, as the oil then acquires a brownish hue, and an acrid, peppery taste. After the completion of the process, the oil is put into barrels, and is thus sent into market. There is reason, however, to believe that much of the American oil is prepared by merely allowing it to stand for some time after expression, and then drawing off

the supernatant liquid. One bushel of good seeds yields five or six quarts, or about twenty-five per cent. of the best oil. If it is not very carefully prepared, it is apt to deposit a sediment upon standing; and the apothecary frequently finds it necessary to filter it through a coarse paper before dispensing it. Perhaps this may be owing to the plan just alluded to, of purifying the oil by rest and decantation." U. S. Disp. The American castor oil, says Wood and Bache, is also prepared by mere expression, rest and decantation. See *Bené*, ("*Sesamum*,") and Groundnut, ("*Arachis*,") for oils and method of expression.

The beaten beans may be used as a purgative, but an over-dose is sure to act powerfully as a cathartic, and often as an emetic. I have known cases of poisoning in children from eating the seeds. I may add, also, that, to purify the oil of mucilage, which will render it rancid, it should be boiled in a little water; the mucilage being insoluble in the water, may be skimmed off. Any water remaining with the oil should be evaporated, taking care not to burn or over-heat the oil in the process. Soubeiran considers that all processes in which heat is employed are objectionable, as a quantity of fatty acids is produced, which renders the oil acrid; only too high a temperature should be avoided. Pereira says that in England the oil is expressed either by Bramah's hydraulic press, or by a common screw-press, in a room artificially heated. It is purified by rest, decantation and filtration. It is bleached by exposure to light on the tops of houses. In Calcutta it is prepared as follows, Pereira adds: The fruit is shelled by women, the seeds are crushed between rollers, then placed in hempen cloths, and pressed in the ordinary screw or hydraulic press. The oil thus procured is afterward heated with water in a tin boiler until the water boils, by which the mucilage or albumen is separated as a scum. The oil is then strained through flannel and put into canisters. The small seed variety is supposed to yield the most oil. Beans of ricinus are said by Boussingault to be about four times more rich in oil than either flaxseed, olives, or sunflower seed. He says that sixty-two pounds of oil can be procured in one hundred of the castor oil bean. It is stated that in Jamaica castor oil is often obtained by simply bruising the seeds in a mortar, and boiling them in bags under water—the oil rises to

the surface, is skimmed off, strained and bottled for use. This was the plan used on the plantations in South Carolina during the war of independence. It would not do for operations on a large scale. See, also, Encyc. Britannica, art. "Ricinus." The oil is considered good for illuminating purposes. A writer in the Southern Cultivator, p. 29, vol. 7, refers to the discovery of a process for separating *stearine* from the pure oil in the seeds, and making the former into candles.

The Cake left after the expression of castor oil is very advantageously applied to land as a manure for wheat and other crops. An interesting communication upon this subject may be found in the first volume of the Farmer's Register, from T. G. Peachy, Esq., of Williamsburg, Va., the results of whose experiments show the great value of the article. In one experiment he applied from fifty to sixty bushels per acre on seven and a half acres of land sown with ten bushels of wheat, and the product was twenty-six bushels of wheat per acre. In this case the land was so poor that not over five bushels could be expected from it without dressing. He recommends about forty bushels as an ordinary dressing. Mr. Peachy does not think the common impression correct, that the chief efficacy of the cake resides in the portion of oil which it retains. His press, he says, "is a very powerful one, and leaves a very small portion of oil in the cake. There is, moreover, other refuse matter in such an establishment as ours, which contains a vast deal more oil than the cake, which I have used as manure, and been uniformly disappointed in its effects. Accident has enabled me, I think, to solve the difficulty, and to declare my belief that the fertilizing qualities of the oil cake reside *chiefly* in the farina it contains. Some time last year, a vessel laden with flour was stranded near Jamestown, and the flour ruined. Mr. John Mann, who owns a farm in the neighborhood, took two or three of the barrels and top-dressed a small portion of his wheat with it. I was not an eye-witness of its effects; but I was informed that it produced as great an increase of that portion of his crop as my oil cake would have done.

"By experiment, I find that fifty bushels of the cake will weigh 1,800 pounds; and of this quantity I have discovered that ten-eighteenths is farina or flour—equal to five barrels of

flour. The cotton seed, I think, contains more farina, in proportion to the oil, than the castor bean, and, I believe, would produce as great an effect after being deprived of its oil as it would do in its original state."

The leaves of the castor oil applied to the breast of nursing women are reported to be *galactagoque* and to increase powerfully the flow of milk, and used for this purpose in the West India Islands. See Art. Charleston Med. Journal.

STINGING NETTLE, (*Jatropha stimulosa*, Mx.) Grows in dry pine land; vicinity of Charleston; collected in St. John's; Richland; Newbern. Fl. Aug.

The leaves are prickly and highly irritating when applied to the skin. It might be employed like the nettle, (*Urtica*,) as a counter-irritant in epilepsies and diseases requiring stimulating applications. The plants of this family furnish, generally, a stimulating and highly acrid oil and they should be examined.

THREE SEEDED MERCURY, (*Acalypha Virginica*, L.) Grows in dry, fertile lands; vicinity of Charleston; collected in St. John's Berkeley; Newbern. Fl. Sept.

Ell. Bot. Med. Notes, ii, 645. Said by Dr. Atkins, of Coosawhatchie, to be expectorant and diuretic; he has employed it successfully in cases of humid asthma, ascites and anasarca.

Phyllanthus niruri, L. S. Fla. Chap.

It has a bitter and astringent root, successfully prescribed in Jaundice; half an ounce rubbed in milk, given twice a day, is said to effect a cure in a few days; and that both it and the young shoots are said to be diuretic; the leaves are very bitter, and are a good stomachic; Ainslie. Martial states that they are employed in Brazil as a specific in diabetes. Griffith.

MANCHINEEL, (*Hippomane mancinella*, L.) South Florida. Chap.

I find it closely related to Queen's Delight, (*Stillingia*,) and it belongs to the *Euphorbiaceæ*. Wilson describes it is a poisonous, evergreen, tropical tree, of the spurge family. It attains a height of eighty feet, and was esteemed a great curiosity in the hot-houses of Britain. The fruit is the size of an apple. A milky, caustic juice abounds in every part of the tree, and if it touches the human eye, is in danger of causing blindness; and if it falls on any part of the human skin, will blister it; if upon linen, it will make it black, and afterward eat a hole through

it; yet this forms, adds the author from whom I quote, some of the well known *caoutchouc* of commerce. The timber of the machineel is very durable and takes a fine polish, and is much esteemed for various kinds of cabinet-work; but the woodsmen require to dry and consolidate it by surrounding it with artificial fires before felling the trees, else they might be blistered and blinded by its juice. And the cabinet makers must cover their faces with fine lawn while working it, else they might get their eyes inflamed, and temporarily blinded with its exhalations and sawdust. The fruit violently inflames the mouth and throat of any person who tastes it, and it is exceedingly dangerous. Any available part of the plant is so dreadfully active that it cannot, even in the smallest doses, be safely introduced into medicine. A notion prevails among the Americans that the dew which falls beneath the tree is inflammatory and blistering; but this seems to be, the author adds, an absurd exaggeration. The name *Hippomane* signifies horse-madness, ascribing to the tree a maddening effect upon the horse. Rural Cyclopœdia. Its resemblance to our *Stillingia*, which is a mere shrub, is close, and the tree wants a careful investigation at the hands of those living in Florida. I have collected the milk from the *Euphorbia* and *Asclepias* and hardened it, though not in sufficient amount to test its qualities. The salsify is said to yield a large amount of milk, which may furnish caoutchouc.

QUEEN'S DELIGHT; YAW ROOT, (*Stillingia sylvatica*, L.) Collected in the pine barrens of St. John's Berkeley, in great abundance; Richland; vicinity of Charleston; Newbern. Fl. Aug.

U. S. Disp. 687; Frost in So. Journal Med. and Pharm., Oct. 1846; Mér. and de L. Dict. de M. Méd. vi, 535. Dr. Wood says that the Stillingia was introduced to the notice of the profession by Dr. T. Y. Simons, of Charleston. (Am. Med. Record, April, 1828.) See, also, a paper by Dr. A. Lopez, formerly of South Carolina, in N. O. Med. and Surg. Jour. iii, 40; but Mills had stated in his statistics, published in 1824, that "the root acts as an emetic; it is a most powerful cleanser of the blood; used with complete success in diseases where this fluid has been corrupted. The properties of this root are invaluable." This plant exudes a milky juice, very pungent to the taste, and flowing in great abundance from the bruised surface. It is used

to some extent in South Carolina as an alterative in scrofula, in syphilis, in cutaneous diseases, in chronic hepatic affections, and in the composition of diet drinks; it adds to the efficacy of sarsaparilla. I am informed by physicians residing in South Carolina, that they have treated secondary syphilis successfully with it. It is believed to be possessed of valuable properties, and greater attention should be paid to it by those living in the country where it is easily obtained. A tincture is made with the root two ounces, of diluted alcohol a pint. Dose a fluid drachm. A decoction is made of the bruised root one ounce, water one and one-quarter pints. Boil to one pint. Dose, one or two fluid ounces several times a day; an overdose is cathartic or emetic. Dose of the powder fifteen to thirty grains. The milky juices should be examined. I have inspissated that from the *Asclepias* and *Euphorbia*. See these genera.

Since the publication of the first edition of this work, I have employed the decoction of the root of this plant as an alterative in syphilitic sores, occurring in patients in the City Hospital, Charleston, the spread of which nothing else could arrest. It proved completely satisfactory. Phagadenic chancres were rapidly cured under its use. A strong decoction was given three times a day with four drops of nitric acid in each dose. The following was published in the "Floridian" newspaper:

"The herb known as Queen's Delight, (*Stillingia*,) is a sure preventive of chills and fever. It should be taken just before or just as the chill is coming on, and it will soon put the patient in a profuse perspiration. The manner of preparing it is to make a strong tea of the root, either in a green or dry state. Take doses of a wineglassful until it produces perspiration."

TALLOW TREE, (*Stillingia sebifera*, L.) Nat. from China; collected in St. John's, forty-five miles from the ocean. I have seen it growing abundantly near Charleston, on the King street road.

Mér. and de L. Dict. de M. Méd. ii, 476; see *Croton sebif.* of Mich. An ointment made from this is applied in nocturnal fevers. The Chinese, according to Thumberg, employ the concreted oil extracted from the plant, in manufacturing candles. The Reporters of the Patent Office, for 1848, speak very favorably of it, and recommend its introduction, seeming not to be aware of its being already found here. See their method of extracting the oil.

In my report on the Medical Botany of South Carolina to the American Medical Association, in 1849, I had, as above, reported the fact of this tree being already naturalized. The seeds, when burned, give out a great deal of light. It could be planted with profit. In the Patent Office Report, 1851, p. 54, there is also a paper on the uses of the *S. sebifera*, with a notice of the Pe-la, or Insect Wax of China. By D. J. Macgowan, M. D., dated Ningpo, August, 1850. In this article, it is stated that the Encyclopœdia Americana refers to its being grown along our coast. "Analytical chemistry shows animal tallow to consist of two proximate principles—*stearine* and *elaine*. Now, what renders the fruit of this tree peculiarly interesting, is the fact that both these principles exist in it separately, in nearly a pure state." "Nor is the tree prized merely for the stearine and elaine it yields, though these products constitute its chief value: its leaves are employed as a black dye; its wood, being hard and durable, may be easily used for printing-blocks and various other articles; and, finally, the refuse of the nut is employed as fuel and manure." Dr. Roxburgh, in his Flora Indica, had condemned the plant as of little value, because, in simply crushing and boiling the seeds, the two principles referred to as existing together are not properly separated. I had myself, in my report, published in 1849, and also in my paper in DeBow's Review, August, 1861, recommended this plant to the candle and soap manufacturers for the large amount of oil it contained, and because of its abundance around Charleston. I also gave some of the seeds to a manufacturer of castor oil, to experiment with, in 1851. I will now quote from the paper mentioned, and also refer the reader to a paper on the subject in the Charleston Medical Journal, by H. W. Ravenel.

"The *Stillingia sebifera* is chiefly cultivated in the provinces of *Brangsi, Kongnain and Chekkiang.* In some districts near *Hangchan*, the inhabitants defray all their taxes with its produce. It grows alike on low, alluvial plains and on granite hills, on the rich mould, at the margin of canals and on the sandy sea-beach. The sandy estuary of *Hangchan* yields little else. Some of the trees are known to be several hundred years old, and, though prostrated, still send forth branches and bear fruit. Some are made to fall over rivulets, forming convenient bridges. They are seldom planted where anything else can be

conveniently cultivated—in detached places, in corners about houses, roads, canals and fields. Grafting is performed at the close of March, or early in April, when the trees are about three inches in diameter, and also when they attain their growth. The *Fragrant Herbal* recommends for trial the practice of an old gardener, who, instead of grafting, preferred breaking the small branches and twigs, taking care not to tear or wound the bark. In midwinter, when the nuts are ripe, they are cut off, with their twigs, by a sharp, crescentic knife, attached to the extremity of a long pole, which is held in the hand and pushed upward against the twigs, removing at the same time such as are fruitless. The capsules are gently pounded in a mortar, to loosen the seeds from their shells, from which they are separated by sifting. To facilitate the separation of the white, sebaceous matter enveloping the seeds, they are steamed in tubs having convex open wicker bottoms, placed over caldrons of boiling water. When roughly heated, they are reduced to a mash in the mortar, and thence transferred to bamboo sieves, kept at a uniform temperature over hot ashes. A single operation does not suffice to deprive them of all their tallow; the steaming and sifting are, therefore, repeated. The article thus procured becomes a solid mass on falling through the sieve, and, to purify it, is melted and formed into cakes for the press. These receive their form in bamboo hoops, a foot in diameter and three inches deep, which are laid on the ground over a little straw. On being filled with the hot liquid, the buds of the straw are drawn up and spread over the top, and when of sufficient consistence, are placed with their rings in the press. This apparatus, which is of the rudest description, is constructed of two large beams, placed horizontally, so as to form a trough capable of containing about fifty of the rings, with their sebaceous cakes. At one end it is closed, and at the other it is used for receiving wedges, which are successively driven into it by ponderous sledge-hammers, wielded by athletic men. The tallow oozes in a melted state into a receptacle below, where it cools. It is again melted and poured into tubs smeared with mud, to prevent its adhering. It is now marketable, in masses of about eighty pounds each, hard, brittle, white, opaque, tasteless, and without the odor of animal tallow. Under high pressure it scarcely stains bibulous paper; melts at

104° Fahrenheit. It may be regarded as nearly pure *stearine;* the slight difference is, doubtless, owing to the admixture of oil expressed from the seeds in the process just described. The seeds yield about eight per cent. of tallow, which sells for about five cents per pound. The process for pressing the oil, which is carried on at the same time, remains to be noticed. It is contained in the kernel of the nut—the sebaceous matter which lies between the shell and the husk having been removed in the manner described. The kernel, and the husk covering it, are ground between two stones, which are heated to prevent clogging from the sebaceous matter still adhering. The mass is then placed in a winnowing machine, precisely like those in use in western countries. The chaff being separated, exposes the white, oleaginous kernels, which, after being strained, are placed in a mill to be mashed. This machine is formed of a circular stone groove, twelve feet in diameter, three inches deep and about as many wide, into which a thick, solid stone wheel, eight feet in diameter, tapering at the edge, is made to revolve perpendicularly by an ox harnessed to the outer end of its axle, the inner turning on a pivot in the centre of the machine. Under this perpendicular weight the seeds are reduced to a mealy state, steamed in the tubs, formed into cakes, and pressed by wedges in the manner described; the process of mashing, steaming and dressing being repeated with the kernels likewise. The kernels yield about thirty per cent. of oil. It is called *ising-yu*, sells for about three cents a pound, answers well for lamps, though inferior for this purpose to some other vegetable oils in use. It is also employed for various purposes in the arts, and has a place in the Chinese Pharmacopœia because of its quality of changing gray hair black, and other imaginary virtues. The husk which envelops the kernel, and the shell which encloses them and their sebaceous covering, are used to feed the furnaces—scarcely any other fuel being needed for this purpose. The residuary tallow cakes are also employed for fuel, as a small quantity of it remains ignited a whole day. It is in great demand for chafing-dishes during the cold season, and, finally, the cakes which remain after the oil has been pressed out are much valued as a manure, particularly for tobacco fields, the soil of which is rapidly impoverished by the Virginia weed. Artificial illumination in China

is generally procured by vegetable oils; but candles are also employed by those who can afford it and for lanterns. In religious ceremonies no other material is used. As no one ventures out after dark without a lantern, and as the gods cannot be acceptably worshipped without candles, the quantity consumed is very great. With an important exception, the candles are made of what I beg to designate as vegetable *stearine*. When the candles, which are made by dipping, are of the required diameter, they receive a final dip into a mixture of the same material and insect wax, by which their consistency is preserved in the hottest weather. They are generally colored red, which is done by throwing a minute quantity of alkanet root, (*Anchusa tinctoria*,) brought from Shangtung, into the mixture. Verdigris is sometimes employed to dye them green. The wicks are made of rush coiled round a stem of coarse grass, the lower part of which is slit to receive the *pin* of the candlestick, which is more economical than if put into a socket. Tested in the mode recommended by Count Rumford, these candles compare favorably with those made from spermaceti, but not when the clumsy wick of the Chinese is employed. Stearine candles cost about eight cents per pound.

WILD HIPPO; WILD IPECACUANHA, (*Euphorbia corollata*, L.) Collected in St. John's Berkeley, Charleston District, in dry soils; vicinity of Charleston; Newbern. Fl. Aug.

Frost's Elems. Mat. Med. 82; Bell's Pract. Dict. 199; Am. Journal Med. Sci. xi, 22; U. S. Disp. 321; Big. Am. Med. Bot. iii, 119; Royle, Mat. Med. 542; Mér. and de L. Dict. de M. Méd. iii, 179; Clayton's Phil. Trans. Abrid. 331; Zollickoffer, Mat. Med. 1819; cit. in Bart. loc. sup.; Coxe, Am. Disp. 272; Griffith Med. Bot. 593. It is emetic, diaphoretic and cathartic. Dr. Zollickoffer thinks that, as a diaphoretic, combined with Dover's powder, it is not inferior to ipecacuanha. He tried it in seven cases. Twenty grains of the powdered root would produce emesis, sometimes followed by hypercatharsis. Mr. McKeen states that twelve grains of the root in substance have double the purgative power of an equal quantity of jalap. "Combined with opium and the sulphate of potassa, it is an excellent diaphoretic in dropsy." See Dict. de Mat. Méd. Dr. Frost, Prof. Mat. Med. South Carolina Med. Coll., thinks it quite as active as the ipecacuanha, and fully entitled to the consideration of

the profession, he having used it with benefit in his own practice. "Even should they not be employed, every physician should be instructed in their properties, and, when occasion requires, know the substitute he can apply to in case of need." Op. cit. 82. A drachm to eighty or one hundred grains may be added to a half pint of hot water, which may be given in tablespoonful doses every five or ten minutes till vomiting is induced. This is a convenient mode of administration. According to experiment, the contused root will excite vesication and inflammation if applied to the skin. Maj. John Leconte, of New York, informs me that he has been much pleased with its effects as a sudorific. Dose as an emetic, twenty grains; as a cathartic, ten grains; as a diaphoretic, four grains. This plant is easily obtained, and can be conveniently prescribed as a substitute for ipecacuanha. It should be used with caution in cases of insensibility of the stomach.

CAROLINA HIPPO; CAROLINA IPECAC., (*Euphorbia ipecacuanha.*) Grows in Abbeville, Edgefield and Colleton Districts; Newbern. Fl. June.

U. S. Disp. 223; Barton's Med. Bot. 120. An energetic and tolerably certain emetic; but liable sometimes to produce excessive nausea by accumulation; hence, thought by some writers "wholly unfit to supersede the officinal ipecacuanha." This opinion, however, has been questioned by Hewson, Royal and others. Barton said it was equal, and in some respects superior. Lind. Nat. Syst. Bot. 114; Shec. Flora Carol. 555; Mér. and de L. Dict. de. M. Méd. iii, 182; Coxe, Am. Disp. 272; Schoepf, Mat. Med. 74; B. S. Barton. Collec. 26; W. P. Barton, Veg. Mat. Med.; Griffith's Med. Bot. 592; Frost's Elems. 81. It sometimes has its action extended to the bowels, and operates with a considerable degree of activity. Dose as an emetic, fifteen to twenty grains; as a diaphoretic, five grains. Bigelow notices among its constituents caoutchouc, resin, mucus and fæcula. Am. Med. Bot. ii, 109. It is evident, from the variety of opinions expressed in relation to this plant, that it should be given with caution. Both species are considered to be more active than the imported ipecacuanha.

SPURGE; EYE-BRIGHT, (*Euphorbia hypericifolia*, L.) Grows in the upper districts, according to Elliott; vicinity of

Charleston, Bach; collected in St. John's; found by Dr. Boykin in Georgia. N. C. Fl. July.

U. S. Disp. 321. Highly recommended by Dr. Zollickoffer, of Baltimore, in dysentery, after due depletion. Used in diarrhœa, menorrhagia and leucorrhœa; a half ounce of the dried leaves is infused in a pint of boiling water, of which a fluid half ounce must be taken every hour in dysentery, and the same quantity after every evacuation in diarrhœa, and two ounces morning, noon and night, in amenorrhœa, flour albus, etc. See, also, Mér. and de L. Supplém. to the Dict. de M. Méd. 1845, 282, where Dr. Zollickoffer's success in twelve cases is referred to; also, Am. Journal of Med. Sci. Nov., 1832; M. and de L. iii, 181. It possesses some narcotic power, also, which contributes to render it peculiarly applicable in these diseases. Journal Méd. de la Gironde, 161, 1825. Martius says it has the same properties as the *E. linearis*, the milky juice of which is used in Brazil in syphilitic ulcers. He has often tested its value in ulcers of the cornea. Journal de Chim. v, 427. The juice applied to the eye causes severe smarting, and it is thought to cause the severe salivation to which grazing horses are subject. From several of the spurge tribe a gum (*euphorbium*) is obtained by incision, which concretes by exposure to the air. It is a dangerous irritant, and has to be handled with caution. Mixed with starch to weaken it, it may be used externally. Our Euphorbias should be examined for caoutchouc, and the juice investigated carefully and cautiously; so, also, the juice of the *Stillingia*.

SPOTTED EYE-BRIGHT, (*Euphorbia maculata*, L.) Cultivated soils; vicinity of Charleston; collected in St. John's. N. C. Fl. July.

Mér. and de L. Dict. de M. Méd. iii, 184; Ainslie, Mat. Med. Ind. ii, 76. The juice is employed with great success in cleansing the cornea of the spots and pellicles (les pellicules) following small-pox. Mérat says the ancients recommended these plants in diseases of the eye. Dr. Zollickoffer speaks of this species, also, as possessing valuable properties. All are endowed with some emetic power.

Euphorbia helioscopia. Grows near the Horseshoe bridge, Ashepoo, and on Hutchinson's Island. See Ell. Sketch. Fl. May.

Dém. Élém. de Botanique, ii, 21. "A valuable purgative."

According to Mér. and do L. Dict. de M. Méd. iii, 181, it is useful in syphilis when mercury is contra-indicated. Dr. Nonne assures the profession of its utility. See Bull. des Sci. de Fér. ii, 354.

Euphorbia thymifolia, L. Included by Thomas Walter, in his Flora Carolina, among the South Carolina species. Mich. says it grows on the Mississippi. Mér. and de L. Dict. de M. Méd. iii, 188. In India the powder is administered in the verminous disorders of infants. Ainslie, Mat. Med. Ind. 275.

Mercurialis annua. Grows around Charleston. Introduced.

A poisonous, narcotic plant, with emetic properties, but less active than the *M. perennis.* Seeds purgative. It partakes, to a certain extent, of the acrid qualities of the Euphorbiaceæ.

CELASTRACEÆ.

DeCand. says an acrid principle has been detected among the species.

BURNING BUSH; STRAWBERRY TREE; FISHWOOD; SPINDLE TREE, (*Euonymus Americanus.*) Rare; grows in swamps; collected in St. John's Berkeley. N. C. Fl. May.

Griffith's Med. Bot. 220. Emetic, discutient and anti-syphilitic. It is also thought to be narcotic. The seeds are said to be nauseous, purgative and emetic, and are used in some places to destroy vermin in the hair. The leaves are poisonous to cattle.

WAHOO, (*Euonymus atropurpureus.*) Possesses properties similar to the above.

Dr. Wood, in the 12th Ed. of the U. S. Disp., states that Mr. G. W. Carpenter had introduced a bark some twenty years since as a remedy for dropsy, under the name Wahoo, he having obtained a knowledge of its virtues in the Western States. Dr. W. ascertained that it was derived from this plant, which must be distinguished from the Elm of the Southern States, which is also called Wahoo. The bark imparts its virtues to water and alcohol. By analysis of Mr. W. T. Wenzel, it was found to contain a bitter principle, which he named *euonymin*, asparagin, resin, fixed oil, wax, starch, albumen, glucose, pectin and salts. (Am. J. Ph., Sept., 1862.) Mr. W. P. Clothier found the substance, which is the *euonymine* of the Eclectics, to purge actively without griping. Dr. Twyman, of

Mo., informed Dr. Wood that he had found the bark, as a cathartic, rather to resemble rhubarb than to possess hydragogue properties, and he thought that he had obtained from it good results as an alterative to the hepatic functions. The decoction or infusion is used in dropsy, made in the proportion of an ounce to a pint of water, and given in the dose of a wineglassful several times a day. U. S. Disp. See a paper by C. A. Santos, upon the Am. species; Am. J. Pharm. xx, 80.

STAPHYLEACEÆ. (*Bladder-nut Family.*)

THREE LEAVED BLADDER-NUT, (*Staphylea trifolia*, L.) Damp woods, North Carolina, Tennessee and northward (Chap.)

The nut of our tree resembles closely that of the *S. pinnata*, which is used in Catholic countries for making rosaries. Rosaries are also made of the seeds of the Pride of India tree, (*Melia.*) The nuts of the *S. trifoliata* resemble a large, inflated bladder.

Cyrilla racemiflora, Walter. Grows in swamps and inundated lands; collected in St. John's, where it is found in abundance; vicinity of Charleston; Newbern. Fl. July.

Ell. Bot. Med. Notes, i, 295. The outer bark of the oldest shrubs, near the root, is extremely light and friable, and absorbs moisture. It has been used with advantage as a substitute for agaric and other styptics. I learn that it is much confided in for this purpose by those living in Darlington District, South Carolina. When rubbed on the hand, it produces a sensation similar to that produced by the application of an astringent fluid. It has also been applied to ulcers when the indication is to cicatrize them. This plant merits further attention.

TITI, (*Cliftonia ligustrina*, Banks. *Mylocarium*, Wild.) Pine barren ponds and swamps, Florida and lower districts of South Carolina and Georgia.

The stems, when dried, are found to suit admirably for pipestems—a heated wire being passed through the pith. Much used by our soldiers in camps; and now (1868) becoming to some extent an article of trade.

CLUSIACEÆ. (*Balsam Tree Family.*)

YELLOW BALSAM TREE, (*Clusia flava*, L.) South Florida. Wilson, in his Rural Cyclopœdia, says that the balsam tree,

Clusia rosea, grows in Carolina and in the West India Islands. "A balsam resembling turpentine exudes from every part of the tree, and has been much used as a plaster for the cure of sciatica. The West Indians call this balsam hog gum, from a belief that wild hogs rub themselves against it to obtain a cure of their wounds."

WHITE CANELLA; WILD CINNAMON, { *Canella alba*, Swartz. *Winterana canella*, L. }

South Florida. Chap.

This is an aromatic tree, bearing black berries. Every part of the plant is aromatic; the flowers retain much of their odor when dried; and if they be moistened with warm water, the scent becomes very powerful, approaching that of musk. The bark gives out its virtues to alcohol and partly to water; but the infusion though bitter, has very little aroma. Petroz and Robinet show that it contains volatile oil, resin, bitter extractive, *canellin*, gum, etc. Its properties are owing to the first three constituents, but principally to the oil which is used to adulterate oil of cloves. The canellin is a saccharine substance which is very analagous, if not identical with mannite. Canella is employed to cover the taste of several disagreeable tasted articles of the Materia Medica, and enters into the composition of the Pulvis Alues cum Canella; added to the tincture or infusion of senna it covers the nauseous taste of those articles, and prevents them from griping. It is more useful as a condiment than a medicine; Swartz says it is thus employed by the Caribs, and that it forms an ingredient of many dishes among the negroes. In Martinique the berries constitute the basis of a much esteemed cordial. The above account is substantially that of Griffith. See, also, U. S. Disp., Swartz, Trans. Linn. Soc., i, 96, and Woodville's, Stokes', and Stephenson and Churchill's Medical Botany.

PORTULACACEÆ. (*The Purslane Tribe.*)

GARDEN PURSLANE, (*Portulaca oleracea*, Walter.) Grows in yards and rich soils; vicinity of Charleston; collected in St. John's; Newbern. Fl. Aug.

Linn. Veg. M. Med. 88; Mér. and de L. Dict. de M. Méd. v, 458. It is anti-scorbutic, diuretic and anthelmintic, and vaunted

as an antidote for poisoning from cantharides. According to Linnæus, the herb was used in strangury. It will coagulate milk. The American Dispensatories do not vouchsafe it the same notice that it has received in various parts of Europe. It has long been used as a salad and potherb. The young shoots are gathered when from two to five inches long. Rural Cyclopœdia. A blue color is obtained from this plant. The following is given by an agricultural journal: Boil a bushel of garden parsley or purslane till soft, in an iron pot or kettle, and strain off the liquor; boil a pound of logwood, also in iron, for two hours, strain off the liquor and mix the purslane water; then dissolve half a pound of alum in soft water, sufficient to cover three pounds of yarn; put it in a brass or copper kettle, and simmer the yarn in it for three hours; then wring and put into the dye; simmer this three hours, with frequent stirring. The depth of the color may be varied by varying the quantity of the logwood. A very desirable blue dye is obtained. See Ohio and Southern Cultivator.

Dr. C. B. Lucas, of St. John's, S. C., informs me (1868) that several children, and a dog also, were made sick, with vomiting and depression, from drinking the milk of a cow which had been fed on purslane. The same milk given to the dog on the next day again produced vomiting, which occurred almost instantaneously.

SILENECEÆ. (*The Dianthus Tribe.*)

Uniformly insipid.

VIRGINIAN SILENE, (*Silene Virginica*, L.) Grows on the margin of roads; vicinity of Charleston; collected in St. John's. Fl. June.

Griffith, Med. Bot. 188; Barton's Collec. i, 39; U. S. Disp. 1296; Mér. and de L. Dict. de M. Méd. vi, 342; De Cand. Essai, 94; Lind. Nat. Syst. Bot. 125. The decoction of the root acts as an anthelmintic.

SOAPWORT, (*Saponaria officinalis*, Linn.) Nat. in upper districts; Newbern. Fl. Aug.

U. S. Disp. 1293. This plant imparts to water the property of forming a lather, from a principle it contains called *saponin*, which is allied to the active constituent of sarsaparilla, and as a substitute for which it is frequently used. This is obtained

by treating the watery extract with alcohol and evaporating. It has been used in Germany in visceral and scrofulous affections, cutaneous eruptions, and by some is thought superior to sarsaparilla in efficacy. The decoction or the extract may be given. Wade's Pl. Rariores, 32; Mér. and de L. Dict. de M. Med. vii, 220; Flore Med. vi, 311. It is regarded as diuretic, aperient and sudorific, recommended in engorgement of the abdominal viscera, stomach, intestines, lymphatic glands, and in icterus, cachexy, etc. On account of its sudorific properties, it is advised in syphilis, rheumatism and gout. Perrible gave it combined with mercury; while fresh, administering it in doses of one-half ounce of the decoction, or from twenty-four to forty-eight grains of the extract. Journal de Chim. Méd. vi, 747, and vii, 710; Ludolff, Diss. de Rad. Sap. Offic. Erfordiæ, 1756, J. F. Cartheusen, Diss. de Sap. Frankfort; Amielhon, "Si le Struthium des anciens est véritablement la saponaire des modernes." Mém. Nat. des Sci. et des. Arts, i, 587.

Dr. Wood states that Buckholz had obtained *saponin* from the dried root of which this principle constituted thirty-four per cent. (Jour. de Pharm. Sér. x, 339.) It is said to possess poisonous properties. The Soapwort is given as an alterative in the form of decoction and extract, which are taken freely. Audry says that the inspissated juice, given in the quantity of half an ounce in the course of a day, will generally cure gonnorhœa in about two weeks without any other remedy. According to Dr. Bonnet and M. Malapert, this and other plants containing saponin are capable of producing poisonous effects. U. S. Disp., 12th Ed.

A decoction of this plant has been used in some countries as a substitute for soap, and is well capable of cleansing woollen fabrics; the leaves were considered laxative. Wilson's Rural Cyc. Consult "*Sapindus*" and "*Æsculus*," in this volume, for other plants used as substitutes for soap. The *Sapindus* (soapwort) also furnishes one species, *S. marginatus*, which may be useful. Found in Florida and Georgia, near the coast.

BARILLA PLANT, (*Salsola soda.*) I would particularly advise the planting in the Southern States of this plant, (cultivated so largely in Spain, Sicily and Sardinia,) on account of its great value in the ready manufacture of crude soda—which is now supplanting, on account of its cheapness, the use of potash in

the manufacture of soap. Besides, soda gives a *hard* soap. According to the analysis of Ure, "good barilla contains twenty per cent. of real alkali, associated with muriates and sulphates of lime, soda," etc. Caustic lyes made from it are used in the finishing process of hard soap manufacture.

SALTWORT, (*Salsola kali*, L. *S. Caroliniana* of Walt.) It grows in Georgia and northward; and I have little doubt is rich in soda, and may be made of great use to us in the production of this most important product.

The barillas, Ure says, "always contain a small proportion of potash, to which their peculiar value, in making a less brittle or more plastic hard soap than the fictitious sodas, may, with great probability, be ascribed."

The following is the method of preparing soda from the *Salsola*: "Of manufactured soda, the variety most anciently known is barilla, the incinerated ash of the *Salsola soda*. This plant is cultivated with great care by the Spaniards, especially in the vicinity of Alicant. The seed is sown in light, low soils, which are embanked toward the seashore, and furnished with sluices for admitting an occasional overflow of salt water. When the plants are ripe, the crop is cut down and dried; the seeds are rubbed out, and preserved; the rest of the plant is burned in rude furnaces, at a temperature just sufficient to cause the ashes to enter into a state of semifusion, so as to concrete on cooling into cellular masses, moderately compact," etc. "Another mode of manufacturing crude soda is by burning sea-weed into kelp." Ure. Crude soda, and the soda ash of commerce, are made altogether by the decomposition of sea salt. I am not aware whether our native *Salsola kali* grows in abundance upon the coast of the Carolinas and Georgia. See "Corn" (*Zea mays*) for economical mode of making soda from corn-cobs. Also, article "Kelp," in this volume.

Directions for making "Home-made" Soda.—The Richmond Dispatch publishes the following: "The preparation more closely resembles saleratus than soda, and is a comparatively pure article for making bread. It is more valuable in view of the scarcity and high price of soda in our drug stores. After making a strong lye from ashes, boiling down to dryness and burning till white, take the residue and add its own weight of cold water, set in a cool place for several days, say a week,

stirring frequently; then strain through a fine cloth, and boil down again to dryness, stirring frequently, and, finally, cork up the powder so obtained in a bottle. These operations should all be conducted in an iron vessel, not in glass or stoneware."

I insert the following from a journal of the day, hoping that they may prove useful:

"*Soap Receipts.*—In times of war and blockade, when people are thrown almost entirely upon their own resources, every item looking to domestic economy and home production should be carefully observed. Our people have passed through a trying ordeal, but they have learned lessons which will be of practical utility in after times. Habits of economy, and elements of self-reliance, which have been pushed aside by the pressure of an extravagant sentiment, by an increasing love for easy and luxurious living, are now, from the influences of necessity, being resumed, while they are found to embody all of practical utility which they possessed in days of yore."

Looking to the general principle of domestic economy and home effort, I annex the following receipts for making soap, which I find in the Wilmington Journal. One of these has been patented at the North. If tried, they will, no doubt, be found valuable:

"*Family Soap.*—Take six quarts of soft water, six pounds of bar soap, one-quarter of a pound of sal-soda, three teaspoonsful spirits turpentine, one and a half teaspoonsful hartshorn, one teaspoonful of camphor, two teaspoonsful of salt. Cut the soap up fine, boil the water, and add all the ingredients, and boil thirty minutes; take off, and pour into shallow vessels to cool and harden.

"*Another.*—Five pounds bar soap, four pounds sal-soda, two ounces borax, and one ounce hartshorn. Dissolve in twenty-two quarts of soft water, and boil fifteen or twenty minutes.

"*Jelly Soap.*—After pouring out of the vessel the above soaps, pour in water enough to wash off the sides and bottom, and boil twenty minutes. Then pour off to cool, and you have excellent jelly soap for washing clothes, etc.

"*Soft Soap.*—Take ten pounds potash well pulverized, fifteen pounds grease, and three buckets boiling water. Mix, and stir potash and water together until dissolved. Then add the grease, stirring well; put all into a barrel, and every morning

add two buckets cold water, stirring it well each time, until the barrel is nearly full, or mixed to the consistency of soft soap."

Consult Hickory, (*Carya*,) for manufacture of potash and potash soap from ashes.

SPURREY, (*Spergula arvensis*. Walt.; Linn.) Grows in cultivated lands, lower country of South Carolina; vicinity of Charleston; collected in St. John's.

Mér. and de L. Dict. de. M. Méd. vi, 497: "Cows which feed on it give milk of a richer quality, and in larger quantities." The seeds of a variety of this plant growing in Germany continue green during fall and winter, are far superior to pasture grasses, and yield an oil suitable for lamps upon expression. They are also ground up with rye, and used for making bread. Poultry eat spurrey in any form, and are thought to become very prolific of eggs when fed upon it. Rural Cyclopœdia, and Thaër's Agricultural Chemistry.

CHICKWEED; STITCHWORT, (*Stellaria media*, Smith.) Introduced. Yards and gardens.

The herbage is greedily devoured by hogs, and is said to be nutritive, and suitable for being boiled and eaten in the manner of spinach. It has the reputation, when boiled in vinegar and salt, of possessing virtue to cleanse eruptions of the hands and limbs. The flowers serve, in some degree, as a natural barometer, for when rain is approaching they remain closed, and in dry weather they are regularly open from about nine o'clock in the morning till noon. Wilson's Rural Cyclopœdia.

XANTHOXYLACEÆ.

The species belonging to this order are generally aromatic and pungent.

PRICKLY ASH; TOOTHACHE BUSH, (*Xanthoxylum*.)
- *Americanum*, T. and Gray.
- *fraxineum*, Willd.
- *ramiflorum*, Mich.
- *Clava Herculis*, Linn.

Barham's Hortus Americanus. The scraped root is applied to ulcers in order to heal them. The plant possesses stimulating powers, and is a "powerful sudorific and diaphoretic;" remarkable, according to Barton, for its extraordinary property of exciting salivation, whether applied immediately to the gums, or taken internally. It is reported to have been used success-

fully in paralysis of the muscles of the mouth, and in rheumatic affections. Also, in low forms of fever; the tincture of the berries being sometimes employed as a carminative in doses of ten to thirty drops, increasing the quantity when its stimulating effect is desired. Dr. King, of Cincinnati, states that it was beneficially employed in cholera in teaspoonful doses. See Dr. Bates' article; Tilden's J. Mat. Med., April, 1867. Mér. and de L. Dict. de M. Méd. vi, 179; Journal Gén. de Méd. xl, 226. Dr. Gillespie asserts that it is a good tonic and febrifuge. According to Cam, the Indians employed the decoction as an injection in gonorrhœa: "Voyage to Canada." It has been given in syphilis as a substitute for guaiacum, and also for mezereon. See Anc. Journal de Méd. ii, 314. A peculiar principle, *xanthopicrite*, is afforded by it. U. S. Disp. Its acrimony is imparted to boiling water, and to alcohol. According to Dr. Staples, besides fibrous substances, it contains volatile oil, a greenish, fixed oil, resin, gum, coloring matter, and a peculiar crystallizable principle, which he calls *xanthoxylin*. The latter is given in doses of two to six grains. Journal Phil. Coll. Pharm. i, 165. It is stimulating; producing, when swallowed, a sense of heat in the stomach, arterial excitement, and a tendency to diaphoresis. It enjoys considerable reputation in chronic rheumatism. Dose of powder from ten grains to half a drachm. It has been tried by many with advantage in this disease. Barton's Collec. i, 25, 52; Thacher's Disp. sub. *A. spinosa;* Big. Am. Med. Bot. iii, 162. A fluid extract is also prepared and given in doses of fifteen to forty-five drops. (Tilden's Jour. Mat. Med.) In rheumatism an infusion is given, made of one ounce of the bark to one quart of boiling water; one pint to be administered in divided doses during the twenty-four hours. Rep. from Surgeon-Gen. Office, 1862. It should not be confounded with *Aralia spinosa*, sometimes called prickly ash.

X. Carolinianum, Lam. and T. and G. *X. tricarpum*, Ell. Sk.

This species is supposed to be possessed of similar properties with the above. It is the Prickly Ash of the Southern States. T. and G.

Chapman, in his Flora of the Southern States, does not include *X. Americanum* among our Southern plants, but what is said of the medicinal properties of *X. Americanum*, applies to this plant.

These plants have the reputation in America of being powerfully sudorific and diaphoretic, and excite copious salivation, not only when made to act directly on the mouth, but when taken internally, and have been found highly efficacious in paralysis of the muscles of the mouth. Rural Cyc. This may account for their utility in toothache.

I have ascertained (1868) that the decoction of this plant is extensively used by physicians in South Carolina as a remedy in dropsy. In a letter from a medical friend, he reports to me an aggravated case which recovered under its use. A saturated tincture of the berries or root made with whiskey is also given.

HOP TREE, (*Ptelea trifoliata*, L.) Fla. and northward. Chap. N. C.

A small genus of shrubs peculiar to America and India. This species is said by Schœpf, Mat. Med. Am., to be anthelmintic, a strong infusion of the leaves and young shoots being used. The fruit is aromatic and bitter, and is stated to be a good substitute for hops.

SIMARUBACEÆ. (*Quassia Family.*)

ALIANTHUS, (*Alianthus glandulosa.*) Cultivated.

M. Hetel, of Toulon, France, has ascertained that the powdered bark, in doses of seven to thirty grains, are very efficient in the expulsion of the tape-worm. The volatile oil obtained from it is so powerful that persons exposed to the vapors in preparing the extracts, are liable to be seized with vertigo, cold sweats and vomiting. The resin is purgative.

The tree also assumed great importance in an economical point of view; its leaves having been found to be suitable food for a species of silk worm, (*Bombyx Cinthia*,) imported from China. (Journ. de Pharm. Mars. 1859.) U. S. Disp., 12th Ed.

Some suppose that the emanations from the leaves cause fever.

QUASSIA, (*Simaruba glauca*, D. C.) South Florida. A large tree. Chap.

This species of quassia, though not the officinal, should be examined for any bitter tonic properties it may contain and for *quassin.*

GERANIACEÆ. (*The Geranium Tribe.*)

Characterized by an astringent principle, and an aromatic or resinous flavor.

CRANESBILL; CROWFOOT; ALUM ROOT, (*Geranium maculatum*, Linn.) Diffused.

Lind. Nat. Syst. Bot. 137; Coxe. Am. Disp. 304; Eberle, Mat. Med. i, 382; Bell's Pract. Dict. 218; Big. Am. Med. Bot. 189; Thacher's Am. Disp. 224; U. S. Disp. 350; Royle, Mat. Med. 73; Bart. M. Bot. i, 140; Pe. Mat. Med. and Therap. ii, 751; Am. Journal Pharm. iv, 190; Journal Phil. Coll. Pharm. i, 171; Ed. and Vav. Mat. Med, 135; Schœpf, Mat. Med. 107; Barton's Collec. 7; Cutler, Mem. Am. Acad. i, 469; Mér. and de L. Dict. de Mat. Méd. iii, 369; Journal Pharm. xiii, 287. It is a powerful astringent, adapted to passive hemorrhages, chronic diarrhœa, and cholera infantum. It is injected with advantage in cases of gleet and leucorrhœa, and is used as a wash for old ulcers. Bigelow speaks of it as a very powerful astringent, very similar to kino and catechu, and a useful substitute for the more expensive articles. It forms an excellent local application in sore throats and ulcerations of the mouth, and is adapted to the treatment of such discharges as continue from debility after the removal of their exciting causes. Colden and Schœpf also speak highly of the root in dysentery; and Dr. B. S. Barton, in cholera infantum, used the decoction, in milk. Eberle was successful with it, in his treatment of aphthous affections of the mouth, and of ulcerations of the fauces and tonsils. Griffith, Med. Bot. 209. The absence of unpleasant taste and other offensive qualities, remarks Dr. Wood, renders it peculiarly serviceable in the cases of infants and persons of very delicate stomachs. By Staple's examination, Journal Phil. Coll. Pharm. i, 171, it contains tannin, gallic acid, mucilage, a small proportion of *amadin*, and red coloring matter; from the bark, a small quantity of resin and a peculiar crystallizable principle.

Dose of the powdered root in substance, is twenty to thirty grains, one to two ounces of the tincture, and ten to fifteen grains of the extract. The decoction is made by boiling one ounce of the root in one pint of water, the dose of which is one to two tablespoonsful. The extract is said to be the best form; alcohol and proof spirits, however, readily dissolve the active

principle, and the tincture keeps best. The resinoid *Geranin*, as prepared by the Am. Chem. Institute, is given in doses of five grains to an adult, or one grain every hour, to arrest intestinal discharges. They use a solution of this powder in hematuria and as a wash in apthous sore throat; as a wash to the eye and in ointments where astringents are required. Dose of Tilden's extract, three to fifteen grains.

ZYGOPHYLLACEÆ. (*Bean Caper Tribe.*)

Guaiacum sanctum, L. S. Fla. Chap.

This possesses the same properties as the *G. officinale*, Lignum-vitæ or Guaiacum, but in a minor degree. The wood is paler and lighter, and is seldom imported, unless mixed with the true Lignum-vitæ, and as an adulteration of it; may be distinguished by the smaller size of the billets, and the less decided green tint of the heart wood. Griffith. The uses of Lignum-vitæ and the qualities of Guaiac as a medicine, its action on the kidneys in amenorrhœa, and in rheumatism and gout, are well known.

BALSAMINACEÆ. (*The Balsam Tribe.*)

According to De Cand., the species are diuretic. They are chiefly remarkable for the elastic force with which the valves of the fruit separate at maturity, expelling the seeds. Lind.

TOUCH-ME-NOT; JEWEL WEED, (*Impatiens pallida*, Nutt.; T. and G. *Noli me tangere*, Ell. Sk.) Grows in inundated swamps; vicinity of Charleston; collected in St. John's. Fl. July.

Bull Plantes Vén de France, 166: "The whole plant is very acrid, and is used as a cataplasm." Élém de Bot. iii, 58. Six grains of the dried leaves will produce nausea. The U. S. Disp., 1264, speaks of it as a dangerous plant, possessed of acrid properties; when taken internally, acting as an emetic, cathartic and diuretic.

OXALIDACEÆ. (*The Sorrel Tribe.*)

Leaves generally acid.

WHITE WOOD-SORREL, (*Oxalis acetosella*, L.) Mountains of North Carolina and northward. Chap.

The plant is a very agreeable and wholesome salad, and possesses refrigerant, anti-scorbutic, and anti-septic properties. The juice coagulates milk, and precipitates lime from solution. When boiled in milk, it gives off its acidulousness to the whey; and either this whey, or the expressed juice of the plant, much diluted with water, may be used as a good refrigerant drink in fevers. Rural Cyc. The herb is powerfully and most agreeably acid, making a refreshing and wholesome conserve with fine sugar; its flavor resembles green tea.

Dr. Wood states that it owes its acidity to *binoxalate of potassa*, which is sometimes separated for use, and sold under the name of *salt of sorrel;* the process of making which is furnished by him. It is sometimes called essential salt of lemons, and is used for removing iron mold and ink stains. This and other species are refrigerant; and he also adds that their infusion or a whey made with them in milk, may be used as a pleasant drink in febrile and inflammatory diseases, and the fresh plant eaten raw is useful in scurvy. U. S. Disp., 12th Ed.

PURPLE WOOD-SORREL, (*Oxalis violacea*, L.) Grows in rich soils; vicinity of Charleston; collected in St. John's. N. C. Fl. May.

U. S. Disp. 66. It contains the oxalate of potash, which imparts to it its pleasant, acid tasto.

Oxalis corniculata, L. *Oxalis furcata*, Ell. Sk. Vicinity of Charleston; similar in properties to the *Ox. violacea.*

ROSACEÆ. (*The Rose Tribe.*)

None of the species are unwholesome; they are generally characterized by the possession of an astringent principle. The sub-order, *Amygdaleæ*, are better known for yielding Prussic or hydrocyanic acid.

Potentilla, (*canadensis.*) Grows in meadows, in lower and upper districts; St. John's, South Carolina.

Dr. Richard Moore, of Sumter District, South Carolina, informs me that this plant, on account of its bitter, mucilaginous qualities, has been found, by repeated experiment, to be a most efficient and useful remedy in the treatment of chronic colds, threatening phthisis. The decoction is used. He refers to the plant as the *P. reptans* (?).

JUNEBERRY; HIGH BUSH BLACKBERRY, (*Rubus villosus*, Ait.) Diffused; collected in St. John's; vicinity of Charleston; Newbern. Fl. May.

Eberle, Mat. Med. i, 386; Pe. Mat. Med. ii, 453; Ed. and Vav. Mat. Méd. 134; Royle, Mat. Med. 374; U. S. Disp. 603–4; Ball. and Gar. Mat. Med. 267; Big. Am. Med. Bot. ii, 160; Chap. Therap. and Mat. Med. ii, 474; Thacher's U. S. Disp. 341; Lind. Nat. Syst. 144; Barton's Collec. ii, 157; Griffith, Med. Bot. 270. Bigelow considers it a powerful astringent, and is satisfied of its efficacy, administered both internally and externally, in a variety of cases admitting of relief from this class of remedies. Dr. Chapman also speaks highly of it in the declining stage of dysentery, after the symptoms of active inflammation are removed; he asserts that nothing in his hands had done so much to check the inordinate discharges in cholera infantum—two or three doses sufficing to bind up the bowels. The decoction is made of one ounce of the root in a pint and a half of water, boiled down to one pint, of which the dose for a child is two or three teaspoonsful; for an adult, a wineglassful several times a day; orange peal may be added. Dose of the powdered root, twenty or thirty grains. No analysis has yet been made I have little doubt, from my own examinations, (see *Liquidambar*,) that the astringency is owing to tannin. I have frequently used a tea made of the roots of the Blackberry to check the diarrhœa of teething children, and in refractory cases of dysentery, after mercurials and other treatment had been employed, and have always been pleased with the result. I consider it one of the most useful of our astringents.

Dr. Sneed, of Ga., (So. Med. Surg. J. 1867,) maintains that its usefulness in disorders of the bowels, does not depend principally upon the tannic acid it contains, but that its most powerful effect, in these instances, are attributable to the bitter, stimulant, or tonic properties, distinct from its astringent effects. He avers that a small quantity of the fluid extract taken into the stomach increases the appetite. He also uses the bark of the root grated in water in diarrhœas. Tilden's Journ. Mat. Med. Aug. 1867.

I have known cases of chronic diarrhœa and dysentery which recovered after using a strong tea of blackberry root, which had resisted other and persistent efforts for their relief; and I

have had cases of similar benefit following its employment, detailed to me by others.

In the old work on "Herbs," by Nicholas Culpepper, gentleman, "Student in Physic and Astrology," the author observes of one of the genus *Rubus*: "Either the decoction or powder of the root being taken, is good to break, or drive forth gravel, and the stone in the reins and kidneys." "The berries, and the flowers, are a powerful remedy against the poison of the most venomous serpents." P. 48.

I have noticed a *yellow* fruited variety in Fairfield District, S. C., at Aiken's place near Winnsboro'.

I received the following communication from Rev. M. A. Curtis, in answer to inquiries on the subject:

"The White Blackberries, so-called, generally of a dirty amber color, are occasionally met with in different States, from New York to Carolina. The 'New Rochelle' of the gardens, is of this kind. One found in North Carolina is coming into cultivation. Its only advantage is that it makes a prettier jelly than the black."

LOW BUSH DEWBERRY; CREEPING BLACKBERRY, (*Rubus trivialis*, Mich.) Diffused; vicinity of Charleston; collected in St. John's; Newbern. Fl. April.

Watson's Pract. Physic, 820; U. S. Disp. 603; Pe Mat. Med. and Therap. ii, 543; Royle Mat. Med. 375; Chap. on Dis. of Thorac. and Abdom. Viscera, 279; British and For. Med. Review, January 31, 1845; Ball. and Gar. Mat. Med. 268. This is, no doubt, possessed of astringent properties similar to the above; a decoction of the root is said to be a safe, sure and speedy cure for dysentery—a remedy derived from the Oneida Indians.

As *Blackberry wine* is much used as a substitute for more costly foreign wines, I will introduce the following receipe for making it, communicated by Mrs. Summer, of South Carolina, which was said to have been introduced from Virginia by the Rev. Richard Johnson. Blackberry wine, as well as cordial made from the wild cherry, is a pleasantly stimulating beverage, useful as a cordial, capable of being medicated and very serviceable in families, as well as in camps and hospitals. It can easily be made with whiskey, or this may be omitted. It is only strange that so useful and pleasant a drink, and one

within the reach of every one, should, until recently, have been so little made: "To every three pints of berries, add one quart of water; suffer it to stand twenty-four hours, strain through a colander, then through a jelly-bag, and to every gallon of the juice add three pounds of good brown sugar, the whites of three eggs beaten to a froth, and stirred in the juice; a little spice, with two dozen cloves, beaten together, and one nutmeg grated, should be put in a small linen bag and dropped in. After all are mixed, put it in a stone jug, filled up, and kept full with some of the same juice, reserved for that purpose, until it is done working, which will be in two or three weeks. Cork it tightly, and keep it in a cold place for three or four months, then pour it off into bottles, with a little loaf sugar in each bottle; cork and seal close. If the wine is kept for twelve months, it will be still better." It is not easy to over-value the great utility of so mild an alcoholic drink, combining slightly astringent vegetable properties and which may be placed within the reach of almost every one. I have seen this wine of such an agreeable flavor and taste as to be preferred to more valued wines. Cheap, good wines are certainly the greatest boon that could be conferred on any country. See "Grape," *Vitis*, and "Apple," *Pyrus*.

The following is an approved method of making *Blackberry wine*, in vogue in St. John's Berkeley, South Carolina. I insert it in a work of this kind for its general utility, and as it forms an approved liquor which "cheers but not inebriates." Blackberries, six quarts; boiling water, two quarts; brown sugar, two pounds. The whites of six eggs frothed, added when the jug is nearly full. Mash the berries, pour in the water—let it remain twenty-four hours. Strain through a hair sieve and add the sugar. Leave the jug open for two weeks, until fermentation ceases—a glass of alcohol may then be added. An additional pound of sugar would probably secure the wine from the acetous fermentation.

The following modification is considered the most sure means of securing a good result: To every three quarts of berries well mashed add one quart of boiling water—some prefer to add no water; allow it to remain twenty-four hours; strain through a hair seive; to every gallon add two pounds of brown sugar—to every five gallons add the white of four eggs well beaten;

fill the jug; keep some of the preparation and add to the jug every morning until fermentation ceases, then add one glass of alcohol, cork up tightly until the month of March, keeping it in a cool place. The next is very simple, if good.

Blackberry Wine.—The following is said to be an excellent recipe for the manufacture of superior wine from blackberries: Measure the berries and bruise them, to every gallon adding one quart of boiling water; let the mixture stand twenty-four hours, stirring occasionally; then strain off the liquor into a cask, to every gallon adding two pounds of sugar; cork tight and let stand till following October, and you will have wine ready for use, without any further straining or boiling.

A correspondent in the Mobile Register gives the following method of making blackberry cordial:

"*Cordial for Sickness in the Army.*—To alleviate the sufferings and perhaps save the lives of many of our soldiers, whose sickness may be traced to the use of unwholesome water in limestone regions, I recommend the use of blackberry cordial. The following is a good recipe: Bruise the berries and strain the juice through a bag; to each quart of the juice allow a half pound of loaf sugar, a heaped teaspoonful of powdered cinnamon, the same of powdered cloves and a grated nutmeg; boil these ingredients fifteen or twenty minutes, skimming them well. When cool, stir into each quart a half pint of brandy; then bottle and cork well. In case brandy and loaf sugar cannot be had, substitute good whiskey and sugar house molasses."

"*Compound Syrup of Blackberries—Medicated Blackberries.*—Useful as a drink in diarrhœa, and to supply soldiers in camp, either as a remedy in mild cases of diarrhœa or as a vehicle for medicines. To two quarts of the juice of blackberries, add half an ounce each of cinnamon, allspice and nutmegs, and one quarter of an ounce of cloves, well pulverized. Boil them together for fifteen to twenty minutes in a preserve pan or kettle, to get the strength of the spices; strain through a piece of flannel, then add loaf sugar to make very sweet, and while still hot add to every two quarts of the juice one pint of brandy. The dose of this for an adult is about two tablespoonsful repeated. One-fifth portion of the mixture is brandy."

The following substitute for the spiced syrup of Rhubarb, is

given by Dr. Parrish, (Pract. Pharmacy p. 230,) used in the diarrhœa of children. Blackberry root (either species) eight ounces; cinnamon, cloves and nutmegs, each three drachms; sugar, four pounds; water, four pints—boil the roots and the aromatics in the water for one hour, express and strain, then add the sugar, form a syrup and again strain, then add French brandy, six fluid ounces, oil of cloves and oil of cinnamon, of each four drops. Dose for a child of two years old a teaspoonful—a tablespoon for an adult, to be repeated.

The blackberry root is an easily obtained and valuable astringent. A decoction acts as an astringent, and will check diarrhœa. The rind of pomegranate, which is easily portable, boiled in milk, is an excellent remedy in diarrhœa in the army, to be used during scarcity of medicines. The tree grows abundantly in the Southern States; all parts of it are medicinal.

From frequent trials, I know of no remedy for diarrhœa and dysentery of teething children, superior to the decoction of the root of this species; also, during the convalescence from dysentery in adults. It might be much more extensively used on our plantations.

The following preparation from blackberries will be found useful as a *laxative*, and to prevent constipation. Half a pound of brown sugar to every pound of the fruit boiled together for an hour, till the blackberries are soft, stirring and mashing them well. This should be preserved, and will prove a most agreeable laxative for children, on account of the saccharine matter contained in it and the mechanical irritation of the seeds:

" *Blackberries.*—Preserve these as strawberries or currants, either liquid, or as a jam, or jelly. Blackberry jelly or jam is an excellent medicine in summer complaints or dysentery. To make it, crush a quart of fully ripe blackberries with a pound of the best loaf-sugar; put it over a gentle fire and cook it until thick; then put to it a gill of the best fourth-proof brandy; stir it awhile over the fire, strain, then put in pots.

" *Blackberry Syrup.*—Make a simple syrup of a pound of sugar to each pint of water; boil it until it is rich and thick; then add to it as many pints of the expressed juice of ripe blackberries as there are pounds of sugar; put half a nutmeg grated

to each quart of the syrup; let it boil fifteen or twenty minutes, then add to it half a gill of fourth-proof brandy for each quart of syrup; set it by to become cold; then bottle it for use. A tablespoonful for a child, or a wineglass for an adult, is a dose.

"*Blackberry Cordial Medicated.*—It is recommended as a delightful beverage, and a remedy for diarrhœa or ordinary disease of the bowels:

"To half a bushel of blackberries, well mashed, add a quarter of a pound of allspice, two ounces of cinnamon, two ounces of cloves; pulverize well, mix and boil slowly until properly done; then strain or squeeze the juice through homespun or flannel and add to each pint of the juice one pound of loaf-sugar; boil again for some time, take it off, and while cooling add half a gallon of best brandy. For an adult, half ounce to an ounce; for a child, a teaspoonful or more, according to age."

Blackberry Jelly is made by washing the berries, to each pound adding a half pound of sugar, place on a stove and simmer, pour off the juice which is to be boiled down to a jelly, the seeds being thus excluded.

The leaves of the blackberry and raspberry carefully dried are recommended as substitutes for foreign tea. Upon experiment, I find the tea drawn from them agreeable and pleasant, and perhaps slightly stimulating or sedative, as the case may be, but the *herb* taste is rather too prominent.

VIRGINIAN, OR WILD RASPBERRY, (*Rubus occidentalis*, Linn.) Grows in the upper districts; collected in St. John's; Newbern.

Mér and de L. Dict. de M. Méd. vi, 131. Properties identical with the above. It is thought to be a specific in dysentery.

STRAWBERRY. (*Fragaria vesca*, Ex.) Cult.

Flore Med. iii, 169; Griffith Med. Bot. 277. Gesner speaks of the good effects of the fruit in calculous disorders, and Linnæus extolls its efficacy in gout, having, he says, prevented paroxysms of it in himself by partaking of this fruit very freely. They are also supposed to possess vermifuge properties, and to be useful in phthisis. The leaves are astringent, and are recommended in bowel complaints; and the roots are much used in Europe as diuretics; frequently given in dysuria, in infusion, made with an ounce to the pint of water. *Op. cit.*

Lallemand, in his work on Spermatorrhœa, p. 310, states that strawberries are quite serviceable in relieving irritable conditions of the bladder and urethra. Rousseau mentions this as true of himself, see his *Confessions;* and I have known of persons in ill-health during the winter who rapidly recovered as soon as this fruit could be procured—owing doubtless to the need of the vegetable acids they contain.

SCARLET VIRGINIAN STRAWBERRY, (*Fragaria Virginiana*, Erhart.) Rich woods; Florida to Virginia. Chap.

It was introduced into England in 1629 and possessed a fame equal to the hautbois. The pulp has a fine flavor. Rural Cyc. This plant is well known, and its economical value and application require no description. The use of the fruit often acts beneficially upon dyspeptics, who are benefited by acids. "The old Carolina strawberry is a well known and much esteemed variety. The pulp is colored and juicy, and has a fine vinous flavor." By pinching off all the first flowers of early bloom varieties, the flowers will appear and fructify the present autumn. Rural Cyc. They require constant watering to bear almost constantly.

WHITE AVENS, } *Geum Virginianum*, Linn.
" *Carolinianum*, Walt.

Griffith, Med. Bot. 279; Raf. Med. Fl. i, 220. This plant is possessed of tonic and astringent properties, recommended by Ives and Bigelow in dyspepsia, and debility of the viscera; employed, also, with success in leucorrhœa and chronic hemorrhages. It is not supposed, however, to be possessed of much power; one drachm of the powdered root may be used, or a decoction made by one ounce to one pint of water, of which the dose is one ounce several times a day. In domestic practice, it is given in the shape of a weak decoction, as tea.

AGRIMONY; FEVERFEW; COCKLE BURR, (*Agrimonia Eupatoria*, L.) Diffused in cultivated lands; Newbern. Fl. July.

Parr's Med. Dict. Art A. Eup.; Pe. Mat. Med. and Therap. ii, 76: Lc. Mat. Med. i, 1251; Royle, Mat. Med. 602; Hoffman's Obs. Phys. Chim. i; Obs. i; Ell. Bot. Med. Notes, i, 403, note; U. S. Disp. 145; Ed. and Vav. Mat. Med. i, 281; Ball and Gar. Mat. Med. 431; Bergii, Mat. Med. 287; Mér. and de L. Dict. de M. Méd. i, 63; Woodv. Med. Bot.; Ann. de Chim. lxxxi, 332;

Coxe, Am. Disp. 18; Shec. Flora Carol. 96; Dém. Élém de Bot. i, 442. The root and leaves, before the flowers are produced, are acrid and astringent, and are serviceable in passive hemorrhages, diarrhœa leucorrhœa and gonorrhœa, and are highly recommended as a deobstruent in obstructions of the spleen, and in diseases arising from torpor of the liver, as dropsy, jaundice, etc. The roots and leaves have been found efficacious in involuntary discharge of urine (enuresis.) Ray's Cat. Plantarum; Am. Herbal, by J. Stearns, 89; Lightfoot's Fl. Scotica. It is styptic; it strengthens the tone of the stomach, and it has been employed in chronic diarrhœa. The plant, digested in whey, affords a very grateful diet drink. See Linnæus Veg. M. Med. 88. The Indians used it in intermittent fever. Colonel Seaborn, of Pendleton District, S. C., writes me word that he has known the plant, boiled in milk, given successfully in snake bites, and injuries arising from the stings of spiders. The dose of the powder is one drachm; of the infusion of six ounces of root in one quart of boiling water, the dose is one ounce. In popular practice, the leaves are applied as a cataplasm to contusions and fresh wounds. It is used by the steam practitioners. See Howard's Imp. Syst. Bot. Med. 284. The leaves and stalks impart a beautiful and permanent gold color to animal wool, previously impregnated with a weak solution of bismuth, and the flowers are employed by tanners for curing soft and delicate skins. I have obtained a delicate yellow dye from the leaves (1862) which might be useful in coloring kid gloves, morocco skins, etc.; alum should be used to fix the color.

Spiræa trifoliata and stipulacea. See Gillenia.

HARDHACK; STEEPLE-BUSH, (*Spiræa tomentosa*, Linn.) Grows in the upper districts, and in Georgia; Newbern. Fl. July.

U. S. Disp. 682; Raf. Med. Fl. ii, 91. A valuable tonic and astringent; administered in diarrhœa, cholera infantum, and other complaints where medicines of this class are indicated. Wood says it is peculiarly adapted, by its tonic powers, to cases of debility, as it does not disagree with the stomach; but it should be avoided during the existence of inflammatory action or febrile excitement. It was employed by the Indians, and brought to the notice of the profession by Dr. Cogswell, of Conn. Dr. Ives is of the opinion that the root is the least valuable por-

tion; tannin, gallic acid, and bitter extractive are among its constituents, and its virtues are extracted by water. Mér. and de L. Dict. de M. Méd. vi, 507. According to Mead's Thesis, it is given with success in the second stages of dysentery and diarrhœa, having virtues attributed to it analogous to those of quinine. See, also, Journal Univ. des. Sci. Méd. xxiv, 238, and Thesis in New York Med. Repos. (Mérat, *op. cit.*) The extract is said to be fully equal to catechu, and might very well take its place. As it does not disagree with the stomach, it is considered a very valuable addition to the materia medica. Griffith, Med. Bot. 280. From five to fifteen grains of the extract may be taken, or two ounces of the decoction, prepared by the addition of one ounce of the plant to one pint of water. The extract is preferable; made by evaporating the decoction of the stems, leaves or root. This is taken cold, and repeated several times during the day. Great use might be made of this plant, particularly by practitioners residing in the country. In a communication from Dr. S. B. Mead, of Illinois, he informs me that he has employed it in obstinate diarrhœas in place of opium.

NINE-BARK, (*Spiræa opulifolia*, Linn.) Grows along streams. S. and N. C.

Griffith's Med. Bot. 282. This is not so astringent as the *S. tomentosa*, though Rafinesque (Med. Flora) says it is possessed of similar properties. It has an unpleasant odor, which renders it objectionable as an internal remedy. It is, however, much employed as an external application, in the form of fomentation, or as a cataplasm to ulcers and tumors. The seeds are externally bitter, and are said to be tonic. The bark separates in thin layers, hence the name.

INDIAN PHYSIC, { *Gillenia trifoliata*, Nutt. *Spiræa*, Linn. }
Grows in the upper districts; also in Geo. Fl. July.

Big. Am. Med. Bot. iii, 10; Bart. M. Bot. 165; U. S. Disp. 353. It is a mild emetic according to some writers; largely employed as a substitute for ipecacuanha. Bigelow thinks it is not a certain emetic, but Zollickoffer, Barton, Eberle and Griffith unite in testifying to its value; the latter entirely disproves Baume's unfavorable report. In small doses, it acts as a gentle tonic, especially in torpid conditions of the stomach. Accord-

ing to Mér. and de L. Dict. de Méd. 509, (see *Spiræa trifol.*,) its properties partake also of a stimulating character. Coxe, Am. Disp. 305; Carson's Illust. Med. Bot. pt. 1st, 40, 1847. Shreeves (Ex. in the Am. Journal Pharm. vii) found in it starch, gum, resin, wax, fatty matter, red coloring matter, and a peculiar principle, soluble in alcohol and dilute acids, but insoluble in water and ether. According to the statement of Dr. Staples, it contains no *emetine*. It may be conveniently given as an emetic, by boiling the root and giving one or two ounces of the decoction at a dose till vomiting is induced. "The tincture of the root is an infallible remedy for milk sickness. "Cherokee Doctor." The dose of the powdered root is thirty grains, persisted in till vomiting takes place; two to four grains act as a tonic, and sometimes as a sudorific. The infusion will occasionally produce hyperemesis and catharsis. Lind. Nat. Syst. 144; Frost's Elems. 80; Inaug. Diss. of Dr. De La Motta, of Charleston, published in Philadelphia; Schoepf, M. Med. 80; Bart. M. Med. 26; Griffith's Med. Bot. 283; Griffith, in Journal Phil. Coll. Pharm. iv, 177.

AMERICAN IPECAC., } *Gillenia stipulacea*, Nutt. *Spiræa*, of Mich.

Grows on the Saluda mountains; N. C. Fl. July.

Lind. Nat. Syst. Bot. 144. It is emetic and probably tonic, and is possessed of properties similar to those of the *S. trifol.*, though it is said to be more certain in its effects, and not to have been deteriorated by cultivation. U. S. Disp. 353; Griffith's Med. Bot. 284.

COCKSPUR THORN; HAW, (*Cratægus crus galli.*) Grows in swamps.

Mér. and de L. Dict. de M. Méd. ii, 460. Dr. Darlington regards it as one of the best thorn plants for hedges; it is much used in Delaware. Fl. Cestrica. It is better than the Washington thorn, *C. cordata*. These and the species of Pear, *Pyrus*, should be examined for the alkaloids *propylamin* and *secalina*. See *Sorbus acuparia*.

CRAB-APPLE, (*Pyrus coronaria*, Linn.) Newbern. Fl. May.

It is not employed medicinally. The fruit is very acid to the taste, and is often made into preserves. The acid juice is known under the name *verjuice*, and has been applied to sprains and bruises. *Phloridzine* has been obtained from this genus—said

to have succeeded in intermittents where quinia had no effect. Dungl. New Remedies. Ten to fifteen grains may be given dissolved in a little ammonia and water. Mills, in his Statistics of S. C., says that the fruit makes the finest cider; that the leaves afford a yellow dye, and that the acid juice of the fruit is used in recent sprains, and as an astringent and repellant. The bark, with that of the white hickory, gives a yellow dye. Alum must be used as a mordant. The yarn should first be boiled with soap and water, then wrung out and boiled in the preparation.

APPLE, (*Pyrus malus.*) Cultivated. The apple, pear, (*P. communis*,) and quince, (*P. cydonia*,) grow very well in the Southern States in districts removed from the seacoast. The pulp surrounding the seeds of the latter is often dissolved in water and used as a mucilage. See authors.

Perry from pears is made very much like cider. Hitt's method of keeping pears and apples is described by Wilson in his Rural Cyc. Art. "Fruit storing." Having prepared a number of earthenware jars, and a quantity of dry moss, (different species of *Hypnum* and *Sphagnum*,) he placed a layer of moss and of pears alternately, till the jar was filled; a plug was then inserted and sealed around with melted rosin. These jars were sunk in dry sand to the depth of a foot—preferring a deep cellar for keeping them to any fruit room. Millar's plan is also described. After sweating and wiping, in which operation great care must be taken not to bruise the fruit, the pears are packed in close baskets, having some wheat straw in the bottom and around the sides, to prevent bruising, and a lining of thick, soft paper, to hinder the musty flavor of the straw from infecting the fruit. Only one kind of fruit is put in each basket. A covering of paper and straw is fixed on the top, and the basket is then deposited in a dry room, secure against the access of frost; and the less air is let into the room the better the fruit will keep. Some preserve apples and pears in glazed earthenware jars, with tops, by placing dried sand between each layer of fruit—the jars to be kept in a dry, airy situation, secure from frost.

The gum exuding from the apricot tree dissolved in water acts as a substitute for gum arabic as an adhesive agent; see, also, *Bletia aphylla*. I find that from the wild orange, in boil-

ing water, acts admirably as a glue for paper. The wood of the pear and apple is very hard, and will probably supply some of our best material for wood engraving; see *Amelanchier*, with which it is closely related. The pear and apple are employed to make wooden type for mammoth letters. The apple is the best material for plane stocks, as it becomes harder and more polished the more it is used.

The bug, or plant louse, which in the shape of a hoary covering destroys the apple tree, is generally an *aphis* or an *eriosoma;* see Wilson's Rural Cyclopœdia, a full account; also, papers on the "Insects destructive to Trees," in the Patent Office Report on Agriculture. In these the remedies are given. "The best of the methods, as to at once cheapness, cleanliness and efficiency, are syringing with soap suds and tobacco water, minutely brushing with spirits of turpentine, brushing with a mixture of soap lees and one of oil of turpentine, and brushing with brown, impure, pyroligenous acid." Wilson. See "peach," "pear," mode of keeping, etc. Planting apricots near by will divert the insects to their fruit. Turning hogs in orchards, which consume the fallen fruit, is one of the means of destroying the larvæ, which produces the fly of the next season.

A species of wine is made from apple cider by adding sugar and alcohol. *Cider* may be kept by digging under ground dry cellars, and covering from the sun. Vinegar made from cider is of the best quality. It is easily made in a warm place by adding a little mother of vinegar to the sour cider in a barrel. It is ready for use in a few weeks. The strength and purity of vinegar, as determined by the framers of the United States Pharmacopœia, is as follows: "One fluid ounce is saturated by about thirty grains of crystallized bicarb. of potassa. It affords no precipitate with solution of chloride of barium, and is not colored by sulphohydric acid."

Good cider is deemed a pleasant, wholesome liquor during the heats of summer; and Mr. Knight has asserted, and also eminent medical men, that strong, astringent ciders have been found to produce nearly the same effect in cases of putrid fever as Port wine.

The unfermented juice of the apple consists of water and a peculiar acid called *malic acid*, combined with the saccharine principle. Where a just proportion of the latter is wanting,

the liquor will be poor and watery, without body, very difficult to preserve and manage. In the process of fermentation, the saccharine principle is in part converted to alcohol. Where the proportion of the saccharine principle is wanting, the deficiency must be supplied either by the addition of a saccharine substance before fermentation, or by the addition of alcohol after fermentation; for every one must know that all good wine or cider contains it, elaborated by fermentation, either in the cask or in the reservoirs at the distillery. The best and cheapest kind is the *neutral spirit*—a highly rectified and tasteless spirit, obtained from New England rum. Some, however, object to any addition of either sugar or alcohol to supply deficiencies, forgetful that these substances are the very elements of which all wine, cider, and vinous liquors are composed. The strength of the cider depends on the specific gravity of the juice on expression: this may be easily ascertained by weighing, or by the hydrometer.

Newark, in New Jersey, is reputed one of the most famous places in America for its cider. The cider apple most celebrated there is the Harrison apple, a native fruit; and cider made from this fruit, when fined and fit for bottling, frequently brings ten dollars per barrel, according to Mr. Coxe. This and the Hughs' Virginia Crab are the two most celebrated cider apples of America. Old trees, growing in dry soils, produce, it is said, the best cider. A good cider apple is saccharine and astringent.

To make good cider, the first requisite is suitable fruit; it is equally necessary that the fruit should be not merely mellow, but *thoroughly mature*, rotten apples being excluded; and ripe, if possible, at the suitable period, or about the first of November, or from the first to the middle, after the excessive heat of the season is past, and while sufficient warmth yet remains to enable the fermentation to progress slowly, as it ought.

The fruit should be gathered by hand, or shaken from the tree in dry weather, when it is at perfect maturity; and the ground should be covered with coarse cloths or Russia mats beneath, to prevent bruising, and consequent rottenness, before the grinding commences. Unripe fruit should be laid in large masses, protected from dews and rain, to *sweat* and hurry on its maturity, when the suitable time for making approaches. The earlier fruits should be laid in thin layers on stagings, to pre-

serve them to the suitable period for making, protected alike from rain and dews, and where they may be benefited by currents of cool, dry air. Each variety should be kept separate, that those ripening at the same period should be ground together.

In grinding, the most perfect machinery should be used to reduce the whole fruit, skin and seeds, to a fine pulp. This should, if possible, be performed in cool weather. The late Joseph Cooper, of New Jersey, has observed emphatically, that "*the longer a cheese lies after being ground, before pressing, the better for the cider, provided it escapes fermentation until the pressing is completed;*" and he further observes, "that a sour apple, after being bruised on one side, becomes rich and sweet after it has changed to a brown color, while it yet retains its acid taste on the opposite side." When the pomace united to the juice is thus suffered for a time to remain, it undergoes a chemical change; the saccharine principle is developed; it will be found rich and sweet. Sugar is in this case produced by the prolonged union of the bruised pulp and juice, which could never have been formed in that quantity had they been sooner separated.

Mr. Jonathan Rice, of Marlborough, who made the premium cider so much admired at Concord, Massachusetts, appears so sensible of the important effects of mature or *fully ripe* fruit, that, provided this is the case, he is willing even to forego the disadvantage of having a portion of it quite rotten. Let me observe, that this rottenness must be the effect, in part, of bruises by improper modes of gathering, or by improper mixtures of ripe and unripe fruit. He always chooses cool weather for the operation of grinding; and instead of suffering the pomace to remain but twenty-four hours or forty-eight hours at most before pressing, as others have directed, he suffers it to remain from *a week to ten days*, provided the weather will admit, stirring the mass daily till it is put to the press. See his communication in vol. vii, p. 123, N. E. Farmer.

The first fermentation in cider is termed the vinous; in this the sugar is decomposed, and loses its sweetness, and is converted into alcohol; if the fermentation goes on too rapidly, the cider is injured; a portion of alcohol passes off with the carbonic acid.

The design of frequent rackings is principally to restrain the fermentation; but it seems to be generally acknowledged that it weakens the liquor. It is not generally practiced, although the finest cider is often produced by this mode. Various other modes are adopted with the view of restraining fermentation—one of which is the following: After a few gallons of cider are poured into the hogshead into which the cider is to be placed when racked off, a rag six inches long, previously dipped in melted brimstone, is attached by a wire to a very long, tapering bung; on the match being lighted, the bung is loosely inserted; after this is consumed, the cask is rolled or tumbled till the liquor has imbibed the gas, and then filled with the liquid. This checks the fermentation; yet the French writers assure us that the effect of much sulphuring must necessarily render such liquors unwholesome.

Black oxide of manganese has a similar effect; the crude oxide is rendered friable by being repeatedly heated red hot, and as often suddenly cooled by immersion in cold water. When finely pulverized, it is exposed for a while to the atmosphere, till it has imbibed again the oxygen which had been expelled by fire. An ounce of powder is deemed sufficient for a barrel. If the cider is desired to be very sweet, it must be added before fermentation, otherwise not till afterward. Mr. Knight, from his long experience and observation in a country (Herefordshire, England,) famous for its cider, has lately, in a letter to the Hon. John Lowell, stated that the acetous fermentation generally takes place during the progress of the vinous, and that the liquor from the commencement is imbibing oxygen at its surface. He highly recommends that new charcoal, in a finely pulverized state, be added to the liquor as it comes from the press, in the proportion of eight pounds to the hogshead, to be intimately incorporated; "this makes the liquor at first as black as ink, but it finally becomes remarkably fine."

Dr. Darwin has recommended that the liquor, as soon as the pulp has risen, should be placed in a cool situation, in casks of remarkable strength, and the liquor closely confined from the beginning. The experiment has been tried with good success; the fermentation goes on slowly, and an excellent cider is generally the result.

A handful of well powdered clay to a barrel is said to check the fermentation. This is stated by Dr. Mease. And with the view of preventing the escape of the carbonic acid, and to prevent the liquid from imbibing oxygen from the atmosphere, a pint of olive oil has been recommended to each hogshead. The excellent cider exhibited by Mr. Rice was prepared by adding two gallons of New England rum to each barrel when first made. In February or March it was racked off in clear weather, and two quarts more of New England rum added to each barrel. Cider well fermented may be frozen down to any requisite degree of strength. In freezing the watery parts are separated, and freeze first, and the stronger parts are drawn off from the centre. I finish by adding the following general rules—they will answer for all general purposes; they are the conclusions from what is previously stated: 1. Gather the fruit according to the foregoing rules; let it be *thoroughly ripe* when ground, which should be about the middle of November. 2. Let the pomace remain from two to four days, according to the state of the weather, stirring it every day till it is put to the press. 3. If the liquor is deficient in the saccharine principle, the defect may be remedied in the beginning by the addition of saccharine substances or alcohol. 4. Let the liquor be immediately placed in a cool cellar, in *remarkably strong*, *tight*, *sweet* casks; after the pulp has all overflown, confine the liquor down by driving the bung hard, and by sealing; a vent must be left, and the spile carefully drawn at times, but only when absolutely necessary to prevent the cask from bursting. The charcoal, as recommended by Mr. Knight, deserves trial.

Fresh and sweet pomace, directly from the press and boiled or steamed, and mixed with a small portion of meal, is a valuable article of food, or for fattening horses, cattle and swine.

Sour casks are purified by pouring in a small quantity of hot water and adding unslacked lime; bung up the cask and continue shaking it till the lime is slacked. Soda and chloride of lime are good for purifying. When casks are emptied to be laid by, let them be thoroughly rinsed with water and drained, then pour into each a pint of cheap alcohol, shake the cask and bung it tight, and it will remain sweet for years. Musty casks should be condemned to other uses. Cider should not be bottled till *perfectly fine*, otherwise it may burst the bottles.

The bottles should be strong and filled to the bottom of the neck. After standing an hour, they should be corked with velvet corks. The lower end of the cork is held for an instant in hot water, and it is then instantly after driven down with a mallet. The bottles must be either sealed or laid on their sides in boxes, or in the bottom of a cellar and covered with layers of sand.

Most of the above information relative to cider making is derived from the American Orchardist, by W. Kenrick, of Boston, Massachusetts, whose list of apple and other nursery trees comprehends almost every kind desirable for any purpose.

The reader will find very explicit instructions for the manufacture of cider in the Penny Cyclopœdia, vol. vii, p. 161; in the Lib. of Useful Know.; British Husb. vol. ii, p. 364; Low's Pract. Agr. p. 379; Croker, On the Art of Making and Managing Cider; in the Quart. Journal of Agr. vol. viii, p. 332, by Mr. Towers; and in Baxter's Agr. Lib. p. 135, by Andrew Crosse, Esq., of Somerset. The following instructions for making cider are by a Devonshire lady: Gather the fruit when ripe; let it remain in a heap till the apples begin to get damp, then grind them in a mill, (similar to a malt mill;) take the pulp and put it into a large press like a cheese press, only on a much larger scale; place a layer of reed in the bottom of the vat and a layer of pulp alternately until the vat is full. The vat is square, and the ends of the reed must be allowed to turn over every layer of pulp, so as to keep it from being pressed out at the sides. The layers of pulp must be five or six inches thick. When you have finished making your cheese, press it as hard as you can, and let it remain three or four hours; then cut down the corners of it, and lay them on the top with a reed as before; then press it again and allow it to remain for another three or four hours. Repeat this process as long as necessary, or until the cheese is quite dry. It takes seven bags of apples for one hogshead of cider, and the vat ought to be large enough to make from three to four hogsheads at a time. The best sort of apple to make mild cider is the hard bitter-sweet. Any sort of sour apple will do to make the harsh cider. The liquor must be strained through a fine sieve into a large vessel, and allowed to ferment for three or four days, taking off the scum as it rises; then rack it, and put it into casks stopped down quite close.

Before the cider is put into the cask, a match is made of new linen, and attached to a wire, is lighted and put into the cask and the bung is put in to keep the wire from falling into it. After a few minutes the match is removed and the cider poured into the cask while yet full of the smoke.

A person would require three or four years experience before he would be qualified to superintend the making of sweet or mild cider. Much depends on the year, or rather on the ripening of the apples; it should be the *second*, not the *first falling;* and the "green bitter-sweet," and the "pocket-apple," are the best for making it. After pounding, isinglass and brimstone are used to sweeten and fine it, and many other ingredients.

The *sweet* cider, above described, is distinct from the other two kinds of cider, (the harsh and mild.) Cider, according to Brande, contains about nine eight-sevenths parts per cent. of alcohol. It is a wholesome beverage for those who use much bodily exercise. Willich's Dom. Enc.; McCulloch's Com. Dict.

The Sumter Watchman, 1863, recommends a jelly made from cider: Boil cider to the consistency of syrup, and let it cool—no sugar need be added—said to be excellent for convalescents.

Under this genus, I insert the following from Chaptal's Chemistry Applied to Agriculture, as the subject of the manufacture of Liquors from fruits, grain, etc., is important in the present exigency of high duties, etc.: "Good water is undoubtedly the most wholesome drink; but man has almost everywhere contracted the habit of using fermented liquors, and this habit has created in him a want of them; so that if he be deprived of their use, he loses his strength and energy, and becomes less able to work. The best fermented drink is wine; but excepting the wine countries, where the low price of ordinary wine renders the use of it common, the laborer has seldom the means of procuring it daily. It is, therefore, necessary that its place should elsewhere be supplied by such other liquors as will produce nearly the same effect, and this is done by the fermentation of grains, fruits, milk, the sap of trees, etc., from the product of which there is formed in Europe a great variety of liquors; some of these have become very important articles of consumption and of commerce. The peasants, in the greater part of our districts, have acquired the habit of preparing their

liquors from the fermentation of most of these substances; and as the only object I have in view is to furnish information in regard to extending and perfecting these processes, I shall confine myself to pointing out such methods as are easily executed, and which require the employment of such substances only as are everywhere in the hands of the agriculturist:

"All mucilaginous fruits, all fleshy stone fruits, excepting those which yield oil, all grains which contain gluten, sugar, or starch, are capable of undergoing the spiritous or alcoholic fermentation.

"The expressed juice of saccharine fruits may be made to ferment by exposure to a sufficient degree of heat. The method most commonly pursued is that of crushing or grinding the fruits, and thus fermenting the pulp with the juice; in this manner are treated apples, pears, grapes, cherries, etc.

"For such fruits as are not very juicy, but contain, however, some sugar and mucilage, and for such as can be made to keep better by being dried, some water is employed to mix and dissolve the fermentable principles. In this class of fruits may be placed those of the service tree, the cornelian cherry, the medlar, the mulberry, the privet, the juniper, the Neapolitan medlar, the thorn apple, the wild plum, etc., and with them the dried fruits of the plum and fig tree, and some of the other trees and shrubs before mentioned.

"To produce the development of the saccharine principle in bread corns by germination, they must be moistened with water; the spiritous fermentation is afterward excited in them by immersing them in water containing the yeast of beer, or leaven made of wheat flour. The operation of germination may even be suppressed by mixing the meal with a portion of leaven and of lukewarm water. This dough may be allowed to ferment for twenty-four hours, and may then be gradually diluted with water; fermentation will take place in a few hours, and will go on regularly during two or three days. As directions for the manufacture of cider, perry and beer for general consumption are much less necessary here than those for procuring for farmers, (or soldiers, I add,) wholesome liquors at a trifling expense, I shall confine my observations to this object. Grapes furnish the best liquor, and that in the greatest quantity; but when this is drunk clear, it serves but little purpose for

quenching thirst; when made use of in large quantities, it impairs the strength. The liquor called *piquette*, which is manufactured by our farmers, supplies advantageously the place of wine, serving as a tonic, and at the same time quenching thirst. *Piquette* is made from the pressed and fermented mash of red grapes, by means of water filtrated through it till it acquires, in some degree, the color and appearance of wine; it is, even in this state, a better drink than water, inasmuch as it is slightly tonic; its good qualities may, however, be much increased by fermentation. *Piquette* can be kept but a short time unchanged, and, from this tendency to sour, it is necessary that it should be made only in such quantities as are immediately wanted, and that the manufacture of it should be continued at intervals throughout the year. For this purpose the pressed mash of red grapes is put into a cask, care being taken to crowd it in till the cask is completely full, after which it is hermetically closed, so as to exclude air and moisture, and set in a cool, dry place. When the *piquette* is to be prepared for use, the head is taken out of the cask, and water is thrown upon the mash until the whole mass is moistened with it, and the water stands upon the top; fermentation soon takes place, as becomes evident by the light foam which arises; it is completed by the end of the fourth or fifth day; from this time the liquor may be drawn off for daily use—the place of the portion removed being supplied by an equal quantity of water thrown in upon the top of the mash. In this manner a cask of mash, of the capacity of sixty-six gallons, may furnish about four gallons of drink per diem, and will continue to yield it for about twenty days.

"As the mash of white grapes cannot be made to ferment with the juice, this last is separated and put into casks to ferment by itself, and the *piquette* is then made by adding to the mash the necessary quantity of water. This liquor is more spiritous than that made from red grapes, and keeps better; it is, therefore, reserved for use during the latter part of the summer. If instead of throwing pure water upon the mash as is everywhere done, this liquid should first be slightly sweetened and heated, and then receive the addition of a little yeast, *piquette* of a very superior quality would be obtained. In the absence of yeast or leaven, the scum which arises upon wine, especially white wine, during fermentation, may be used for the same

purpose; this foam or scum may be dried, and thus preserved for use without undergoing any change.

"Well made *piquette* is a very wholesome drink for country people, for its tonic properties, as well as its power of quenching thirst; *it is far preferable, as a daily drink, to wine;* but this resource is only local, as in most countries that are most fruitful in grapes, if the harvest fall short, there can be but little *piquette* made; it is necessary then to be able to supply its place from some other source, and this is done by the fermentation of certain fruits.

"Apples and Pears, as being the fruits that are most abundantly produced, are the most valuable for the purpose of manufacturing Liquors. A mixture of the two produces a more wholesome article of drink than does either treated separately. The juices of plums and other fruits may likewise be added, as their astringency renders the liquor more tonic. Excellent liquor may be produced, both from apples and pears, by following the well known method of making cider, which consists in grinding the fruit with a millstone and fermenting the pulp and juice together; but upon farms, where we seldom find the means of preserving liquors unchanged, it is necessary that the processes be simple, and such as can be made use of for preparing them as they are needed. I shall, therefore, recommend the following method: Begin to collect the apples and pears which fall from the trees toward the end of August, and continue to do so till they have arrived at maturity; cut them in pieces as fast as they are gathered; dry them first in the sun and afterward in an oven from which the bread has been drawn. If the fruit be well dried in this manner, though it may grow dark colored, it may be kept unchanged for several years. When drink is to be prepared from these dried fruits, put about sixty pounds of them into a cask, which contain sixty-six gallons; fill the cask with water, and allow it to remain four or five days; after which, draw off the fermented liquor for use. The liquor thus prepared is very agreeable to the taste; when put into bottles it ferments so as to throw out the cork as frothing Champagne wine does. Though wholesome and agreeable, it may become still more conducive to health by mixing with the apples and pears one-twentieth of the dried berries of the service tree, *Amelanchier canadensis*, (*Aronia botrya-*

pium, Ell. Sk., which grows in the Carolinas,) and one-thirtieth of juniper berries; from these the liquor acquires a slightly bitter taste, and the flavor of the juniper berries, which is very refreshing, and it is besides rendered tonic and anti-putrescent. The use of this drink is one of the surest means that can be taken by the husbandman for preserving himself from those diseases to which he is liable in autumn, and for the attacks of which he is preparing the way during the greatest heats of summer.

" After the spiritous portions of the liquor have been drawn off, very agreeable *piquette* may be made from the pulp which remains in the cask; for this purpose it is only necessary to crush the fruit, which is already soft, and to add to it as much lukewarm water, to which a small quantity of yeast has been added, as will fill the cask, fermentation commencing in a short time, and terminating in three or four days. To flavor this liquor and render it slightly tonic, there may be added to it before fermentation a handful of vervain, three or four pounds of elder berries, and of juniper berries.

" Cherries, and particularly the small bitter cherries, when ground and afterward fermented in a cask, in the same manner as the mash of grapes, and then pressed to separate the juice from the pulp, furnish a liquor containing much spirit. The wine made from cherries, when distilled, affords an excellent liquor, which, although not exactly the same as the good *Kirschwasser* of the Black Forest, is yet a valuable drink, and is sold in commerce under the same name.

" The berries of the Service tree, dried in an oven, and put into a cask in the proportion of about sixteen or eighteen pounds of fruit to twenty-six and a half gallons of water, furnish, after four or five days fermentation, a very good drink. Plums and figs, dried either by the sun or in an oven, may be made use of for the same purpose. In order to render the liquor more wholesome or more agreeable, several kinds may be mixed together, and thus the defects of one kind may be compensated for by the good qualities of the other. A few handfuls of the red fruit of the bird-catcher service tree counteract the flat, sweetish taste of certain other fruits.

" In our farming districts the berries of the Juniper are carefully collected and fermented, in the proportion of about thirty

pounds of berries to thirty-eight and a half gallons of water. The drink procured from these is one of the most wholesome possible, but it requires a little use to reconcile one to the odor and flavor of it; those, however, who drink it, prefer it after a short time to any other liquor. The juice of the juniper contributes so much to health that I cannot too strongly recommend its being mixed, in greater or less quantities, with all fruits which are to be subjected to fermentation; its flavor alone will disguise the taste of such liquors as, without being unwholesome, are flat, sickish or otherwise unpleasant. Count Chaptal probably refers here to the juniper growing in Holland, from which gin is procured. Our common red cedar, growing in South Carolina, (*Juniperus Virginiana*,) is closely related to the European juniper, and the berries, perhaps, may be used in flavoring drinks and the leaves employed in place of savin. See *Juniperus*.

"The rinds of Oranges or Lemons, aromatic plants, Angelica roots, (grow in South Carolina,) Peach leaves, etc., may likewise be mixed with any of these fruits which are naturally too sweet and thus serve to raise the flavor of the fermented liquor, and render it more strengthening and efficacious in preventing the attack of disease.

"I do not doubt but that by the application of the true principles of science, and by employing only those products which nature yields us abundantly and without expense, we can procure for the husbandman a variety of drinks more healthy, more agreeable, and better adapted for quenching thirst than the weak and imperfectly fermented wines made from green grapes.

"I have limited myself to pointing out the simplest methods in which such articles as are within the reach of every peasant may be made use of; if such liquors as are more spiritous be wished, they can be obtained by dissolving from four to six pounds of the coarsest kinds of sugar in from five and a half to ten and a half gallons of warm water, and throwing the solution upon the mash when the cask is filled with it, supposing the cask to contain sixty-six gallons. To this may be added any number of pounds of raisins.

"Liquors suitable for drinking may likewise be manufactured from the sap of several kinds of trees. In Germany, Holland

and some parts of Prussia, as soon as the returning warmth of spring begins to cause the ascent of the sap, holes two or three inches deep are bored with a gimlet in the trunks of the Birch trees; through the straws which are introduced into the gimlet holes there flows out a clear, sweet juice, which after having been fermented for a few days, becomes a sprightly liquor, that is drank by the inhabitants of those countries with much pleasure. It is thought by them to be very serviceable in counteracting affections of the kidneys, stomach, etc. A single tree will furnish a quantity of drink sufficient to last three or four persons a week. The natives of the Coromandel coast fabricate their *calore* from the sap of the cocoanut tree. The savages of America prepare their *chica* from the juice of the maize, and the drink of the negroes of Congo is made from the juice of the palm tree.

"It cannot be doubted that the sap of all those trees which afford a saccharine substance can be made to yield a spiritous liquor, but I mention only these few as instances, because our own wants may be abundantly supplied from our fruits and grain.

"The fermentation of Rye and Barley has afforded, from time immemorial, a liquor which has supplied the place of wine for the use of the common people in nearly all those countries in which the vine cannot be made to flourish; in those where wine is made abundantly, the use of Beer is still very extensive, both on account of the nutritive qualities which it possesses in a high degree, and its power of quenching thirst. Though beer may be brewed upon so small a scale as to supply the wants of a single family, I shall enter into no explanation of the process. In Russia a wholesome drink called *quass* is made. One-tenth part of the rye to be employed in its manufacture is steeped in water till it becomes soft; it is then spread thinly upon planks in a place warm enough to produce germination, and it is there sprinkled occasionally with warm water. The remainder of the rye, after having been ground, is mixed with the germinated grain, and the whole is diluted with two gallons and a half of boiling water; the vessel is then set into an oven, from which bread has just been drawn, or exposed to an equivalent degree of heat, during twenty-four or thirty hours; if the vessel be put into an oven which it is necessary to heat every day, it may

be removed during baking, and returned again after the bread is taken out. After this first operation, the fermented substance is diluted by mixing with it two and a half gallons of water at the temperature of 12° or 15°. (If of the Centigrade, 53° to 59°; if of Réaumur, to from 59° to 65°.) This mixture is stirred for half an hour, and then allowed to settle. As soon as a deposit is formed and the liquor becomes clear, it is then thrown into a cask, where fermentation takes place; this is completed in a few days, when the cask is removed into a cellar, and the *quass* soon becomes clear. It is in this state that it is drank by the peasants; but it is much improved by being drawn off in jugs as soon as it has formed its deposit in the cask, and bottled, after having been preserved in these vessels till it has become clear. The liquor prepared in this manner has a vinous and sharp flavor, which is not unpleasant. The color of it is not very precise, being of a yellowish white. The imperfections of *quass* might easily be remedied by adding wild apples, or pears, or juniper berries, to the fermented substances. The fermented liquor might be racked off several times from its lees, and clarified by the same process which we use for wine. The different deposits which are formed during the manufacture of *quass* are entirely of malt, and afford a nourishing and fattening food for animals." The reader is referred to same authority for other methods of manufacturing drinks, beverages, etc., from articles furnished on our farms.

On the subject of fermentation, Chaptal gives the following hints which may avail us in our experiments upon the production of wine. It seems to me that they convey some doctrines similar to those brought forward by Professor William Hume, of South Carolina, in his ingenious essay:

"Generally speaking, the French Grapes, when ripe, contain such proportions of sugar and the vegeto-animal principles as are well adapted for producing the vinous fermentation; but when the summer is cold or damp the proportion of sugar is less, and the predominance of the mucilage (it is from this mucilage that vinegar is formed) renders the liquor weak. In this case the *small quantity of alcohol which is developed is not sufficient to preserve* the wine from spontaneous decomposition, and at the return of heat a new fermentation takes place, the product of which is vinegar. This evil may be easily obviated by artificial

means; it is only necessary to add to the liquor such a quantity of sugar as would naturally have been found in it under usual circumstances." Professor Hume advises the addition of alcohol, I believe, to preserve the wine from the acetic fermentation. See, also, "Treatise on Rural Chemistry," by Ed. Solly. F. R. S. From Lond. ed. Philada. 1852; articles on manufacture of wine, brandy, etc., from fruits and vegetables. Several articles on manufacture of wine can be found in Patent Office Reports. See "Grape."

A *harvest drink* is made by adding ten gallons of water to half a gallon of molasses, a quart of vinegar, and four ounces of ginger. Let the water be fresh from the spring or well; stir the whole well together, and a refreshing drink is obtained.

PEAR, (*Pyrus communis.*)

Fruit trees, particularly the pear, were formally introduced into hedge-rows. It was objected that depredations would be made upon the hedge. Gerard, who wrote on the subject three hundred years ago said: "The poore will breake downe our hedges, and wee have the least part of the fruit. Forward, in the name of God; grafte, set, plant, and nourish up trees in every corner of your ground. The labor is small, the cost is nothing, the commodity is great; yourselves shall have plenty, the poore shall have somewhat in time of want to relieve their necessity, and God shall rewarde your goode mindes and dilligence." See paper on "Best trees for hedges," in Pat. Office Reports, 1854, p. 416. To manufacture perry, cider, etc., consult Wilson's Rural Cyc.; Ure's Dictionary of Arts, etc.; see, also, "Apple."

Dr. John Lindley has written a most instructive article on Fecundation in plants, physiological principles, and methods upon which fruits are produced. See his "Guide to the Orchard and Kitchen Garden," and a condensation in Patent Office Reports, 1856, p. 244. He says that some fruits of excellent qualities are bad bearers, and recommends the following modes of remedying these defects: 1st, by ringing the bark; 2d, by bending branches downward; 3d, by training; 4th, by the use of different kinds of stocks. All these practices are intended to produce the same effects by different ways: "Physiologists know that whatever tends to cause a rapid diffusion of the sap and secretions of any plant, causes also the formation of leaf buds instead of flower

buds; and that whatever on the contrary tends to cause an accumulation of sap and secretions, has the effect of producing flower buds in abundance;" so that a flower bud is often only a contracted branch. By arresting the motions of the fluids and secretions in a tree, we promote the production of flower buds. See, also, same volume, for mode of preservation and transportation of seeds, with the longevity of seeds, their utility and germinative powers. A long list is given of the length of time which seeds can be preserved.

MOUNTAIN-ASH; MT. SUMACH, (*Pyrus Americana*, D. C. *Sorbus microcarpa*, Ph., *acuparia*, Mx.) Highest mountains of North Carolina. Fruit acid.

This plant yields malic acid. I insert the following from Ure's Dictionary, (Farmer's Encyclopœdia:)

Malic acid. This vegetable acid exists in the juices of many fruits and plants, alone, or associated with the citric, tartaric, and oxalic acids; and occasionally combined with potash or lime. Unripe apples, pears, sloes, barberries, the berries of the mountain-ash, elder-berries, currants, goose-berries, strawberries, raspberries, bilberries, bramble-berries, whortleberries, cherries, ananas, afford malic acid; the house-leek and purslane contain the malate of lime.

The acid may be obtained most conveniently from the juice of the berries of the mountain-ash, or barberries. This must be clarified by mixing with white of egg, and heating the mixture to ebullition; then filtering—digesting the clear liquor with carbonate of lead till it becomes neutral; and evaporating the saline solution till crystals of malate of lead be obtained. These are to be washed with cold water, and purified by re-crystallization. On dissolving the white salt in water, and passing a stream of sulphuretted hydrogen through the solution, the lead will be all separated in the form of a sulphuret, and the liquor, after filtration and evaporation, will yield yellow, granular crystals, or cauliflower concretions, of malic acid, which may be blanched by redissolution and digestion with bone-black, and recrystallization.

Malic acid has no smell, but a very sour taste, deliquesces by absorption of moisture from the air, is soluble in alcohol, fuses at 150° Fahr., is decomposed at a heat of 348°, and affords by distillation a peculiar acid—the *pyromalic*. It consists, in 100

parts, of 41.47 carbon, 3.51 hydrogen, and 55.02 oxygen; having nearly the same composition as citric acid. A crude malic acid might be economically extracted from the fruit of the mountain-ash, (*Sorbus acuparia,*) applicable to many purposes; but it has not hitherto been manufactured upon a great scale. Dém. Élém de Bot. 655. The flowers are purgative. The oil from the young branches is caustic, and is employed against ring-worm. M. Dussauce says that the leaves are used for tanning leather. The bark, says Rafinesque, smells and tastes like cherry bark, but more astringent; is anti-septic, and contains prussic acid, used like cinchona in fevers and other diseases. This plant, *Pyrus communis*, and species of *Cratægus*, yield an alkaloid called *secalina* or *propylamin*, considered by Dr. Awenarius, of St. Petersburg, to be a true specific for rheumatic affections, acute and chronic. He adds twenty-four drops of propylamin to six ounces of mint water with two drachms of sugar, and gives doses of a tablespoonful every two hours. Parrish, Pract. Pharm. and Proctor in Proc. Am. Pharm. Assoc. 1857; Am. J. Pharm. xxxi, 125 and 222.

WILD CURRANT; SHADE TREE; SERVICE TREE, (*Amelanchier canadensis*, L. *Aronia botryapium*, of Ell. Sk.) Upper country; Sarrazins Pl., St. John's, S. C.; woods Fla. to Miss., Chapman; Newbern, Croom's Catalogue.

Upon examining with a sharp instrument the specimens of various Southern woods, deposited in the museum of the Elliott Society by Professor L. R. Gibbes, Dr. A. M. Foster, and W. Wragg Smith, Esq., I was struck with the singular weight, density and fineness of this wood. I think I can confidently recommend it as one of the best to be experimented with by the wood engraver. It is also, it will be observed, closely allied to the apple, pear, etc., which are all hard. From my brief examination of the excellent and useful collection above referred to, I would arrange the hard woods as follows, those just cited taking the first rank: next in order, Dogwood, Farcleberry, (*Vaccinium arboreum,*) Redberry, (*Azalea nudiflora,*) and *Kalmia latifolia*. The Holly (*Ilex opaca*) I find to be quite hard when well dried. The beech, (*Fagus sylvatica,*) the hornbeam, (*Ostrya Virginica,*) indigenous plants, have all been recommended for the purposes of the engraver.

While engaged in completing a number of wood engravings

for my Prize Essay for the South Carolina Medical Association, I used a piece of well seasoned dogwood, and obtained a very good impression from coarse figures cut with the graver's tools. I find that none, so far experimented with, equal the boxwood, but I have not yet fully tested the woods put to season. See *Kalmia*, etc.

See apple, (*Pyrus malus*,) for stimulating beverages made from the fruit of the service tree.

Prunus Virginiana. See *Cerasus*. Several South Carolina species furnish fruit, which is eatable, and often employed for various domestic purposes.

WILD CHERRY, } *Cerasus serotina*, T. & Gray. *Prunus Virginiana*, Ell. Sk.

Diffused in upper and lower districts; Newbern. Fl. May.

U. S. Disp. 576; Journal Phil. Coll. Pharm. x, 197, and xiv, 27; Eberle, Mat. Med. 300; Bell's Pract. Dict. 389; Pe. Mat. Med. and Therap. ii, 538; Le Mat. Med. ii, 487; Phil. Trans. 418, and Michaux, N. Am. Sylva, ii, 205; Ball and Gar. Mat. Med. 273; Cullen, Mat. Med. 288; Lind. Nat. Syst. Bot. 147; Woodv. Med. Bot.; Griffith, Med. Bot. 288; Carson's Illust. Med. Bot. pt. 1. This is, undoubtedly, one of the most valuable of our indigenous plants. The bark unites with a tonic power the property of calming irritation and diminishing nervous excitability, "adapted to cases where the digestive powers are impaired, and with general and local irritation existing at the same time." It is peculiarly suited to the hectic fever attending scrofula and consumption, owing to the reduction of excitability which it induces, it is supposed, by the hydrocyanic acid contained in it. Eberle states that the cold infusion had the effect of reducing his pulse from seventy-five to fifty strokes in the minute. In a case of hypertrophy with increased action of the heart, I tried the infusion of this plant, taken in large quantities, according to Dr. Eberle's plan, but without very satisfactory results. It was persisted in for three weeks; the patient, a gentleman aged twenty-five, of nervous temperament, drinking several ounces of it three times a day. The force of the circulation was at first diminished; but the abatement was not progressive; the individual was not made any worse by it. Tincture of digitalis had been likewise used with no beneficial effects. Dr. Wood speaks of the employment of the wild cherry

in the general debility following inflammatory fever. It is valuable, also, in dyspepsia, attended with neuralgic symptoms. Mér. and de L. Dict. de M. Méd. v, 159; Bull des Sci. Méd. **xi**, 303. The bark is indicated whenever a tonic is necessary, from impairment of the constitution by syphilis, dyspepsia, pulmonary or lumbar abscess, etc. I am informed by a correspondent that he finds equal parts of this bark, rhubarb, and the gum exuding from the peach tree, (*Amygdalus communis,*) which likewise affords Prussic acid, when combined with brandy and white sugar, an excellent remedy in dysentery and diarrhœa; one ounce of each is added to one pint of brandy, with a sufficient quantity of white sugar, a tablespoonful of which is taken every half hour. The sensible, as well as the medicinal properties of this plant, are impaired by boiling; cold water extracts its virtues best. The inner bark is officinal. The bark of all parts of the tree is used, but that from the root is most active. The bark is stronger, if collected from the root in autumn, and it deteriorates by keeping. It is tonic, sedative, expectorant. The officinal infusion is thus made: Bark bruised, half an ounce to one pint of cold water; macerate for twenty-four hours. Dose, two or three fluid ounces three or four times a day. To make the officinal syrup: Take of wild cherry bark, in coarse powder, five ounces; sugar, refined, two pounds; water sufficient to moisten the bark thoroughly. Let it stand for twenty-four hours in a close vessel; then transfer it to a percolator, and pour cold water upon it gradually until a pint of filtered liquor is obtained. To this add the sugar, in a bottle, and agitate occasionally until it is dissolved. Dose one-half fluid ounce. By Proctor's analysis, it contains starch, resin, tannin, gallic acid, fatty matter, lignin, salts of lime potassa and iron, and a volatile oil associated with hydrocyanic acid. This proved fatal to a cat in less than five minutes. See Journal Phil. Coll. Pharm. vi, 8; Am. Journal Pharm. x, 197. The leaves, also, are sedative and anti-spasmodic; used in coughs, angina pectoris, etc. The dose of the powdered root is from twenty grains to one drachm. The infusion is the most convenient form. A syrup is also made; beside several secret preparations.

The method of making "*Cherry*" *cordial* by the Southern matrons in the lower country of South Carolina, is as follows: Fill the vessel with cherries, (not washed, if gathered clean,)

and cover with whiskey. After several weeks pour off all the clear liquor and press the cherries through a sieve. Put into the juice thus pressed out five pints of brown sugar, and boil with syrup enough to sweeten the whole. Pour five pints of water on the thick part; boil and strain to make the syrup with the sugar. "Blackberry cordial" is made in the same way; or it can be stewed, strained, sweetened and whiskey added. In the above, the sugar is to be boiled in the water which is obtained from the thick part as directed.

Plum cordial is thus made in S. C.: Fill the vessel with plums after sticking each one. Pour whiskey enough to cover them. After six weeks preserve the plums in half their weight of sugar. Put all together and shake the jug well. The common wild plum is used.

The gum which exudes from the red cherry, the plum and peach, is used in place of gum arabic in increasing the brilliancy of starch and in sealing envelopes.

The wood of this tree is highly valuable, being compact, fine grained and brilliant, and not liable to warp when perfectly seasoned. When chosen near the ramifications of the trunk, it rivals mahogany in the beauty of its curls. Farmer's Encyc.

WILD ORANGE, } *Cerasus Caroliniana*, Mich. / *Prunus Caroliniana*, L., Ell. Sk.

Fl. March.

This is one of the most ornamental of our indigenous evergreen trees, and is planted around dwelling houses. The berries, bark and leaves possess in a high degree the taste characterizing the genus. It deserves an analysis.

This tree, the flowers of which are much frequented by bees, grows abundantly on the seacoast of our States, and is certainly one of the most beautiful and manageable evergreens that we possess. It can be cut into any shape, and is of a most attractive green color. It forms an impervious hedge and grows rapidly. The black, oval berries contain an abundance of Prussic acid, as does the whole tree; but I do not know of any use to which it is applied. Dr. Thompson has found great use from Prussic acid, largely diluted, as a local application in impetigo. He used the infusions of bayberry; no doubt the infusions of the wild orange would be equally useful. In the Patent Office Reports, Agriculture, 1854, '55, p. 376, are papers

on "Live fences," or the planting and management of quick-set hedges. In this the reader will find a most full and satisfactory account of the desirable plants for hedges, both American and European. This is not the place for a full description of these plants and shrubs; but I will at any rate give a list of some of them, and refer the reader to the article. All are of course not adapted to our climate. The English *sloe*, or black thorn, (*Prunus spinosa*,) the hawthorn, (*Cratægus oxyacantha*,) and the buckthorn, (*Rhamnus catharticus*,) have been planted in this country with indifferent success on account of the intense heat of our Southern sun. "The 'Washington Thorn,' (*C. cordata*,) growing in mountains of Georgia, was also brought into notice as a hedge plant toward the close of the last century, and was subsequently employed for that purpose in various sections of the Union; but owing to improper management, and the tendency to disarm itself of its spines after a certain age, it has been discontinued. Similar results have attended the adoption of other species of thorny trees and shrubs in this country, with the exception of the 'Osage orange,' the 'Spanish bayonet,' (*Yucca*,) and the 'Cherokee rose.'" These are natives of this continent.. See article for modes of management, planting, etc., of hedges, with illustrations on wood. The *Arbor Vitæ*, (*Thuja occidentalis*,) one of our native plants, growing only in the highest mountains, is said to be "indigenous, and to grow abundantly on the banks of the Hudson, making the finest ornamental hedge known to this climate." The holly (*Ilex opaca*) and the hemlock spruce (*Abies canadensis*) should be mentioned; also the willow box, (*Buxus sempervirens;*) prickly ash, (*Xanthoxylum fraxineum;*) honey locust, (*Gleditschia triacanthus*)—all these are either natives or are cultivated in the Southern States. See Willow and Osage Orange.

PEACH, (*Amygdalus*.) The peach produces abundantly in the Southern States. The root, leaves and kernels are sometimes employed in medicine, and in seasoning drinks, condiments, etc., being indebted for any virtues which they possess to the hydrocyanic acid contained in them. A tea of the leaves is a favorite domestic palliative in whooping-cough, and in most pectoral affections. A tea or syrup made with either the bark, leaves or flowers, will act freely as a purge. Dose for a child, a teaspoonful repeated every half hour till it operates. A syrup

may be made by adding honey. The leaves are astringent and styptic, and used in domestic practice to arrest bleeding—employed powdered as a snuff in the nose in epistaxis, to stop bleeding. The kernel, which is said to yield as much *amygdalin* as bitter almonds, is used in seasoning, and in making the cordial known as ratifia; also in adding to tonics. The leaves are used in seasoning creams in imitation of vanilla bean. The liquor known as peach brandy is distilled from the fruit. The leaves put in layers with cotton, and boiling water poured over, will dye yellow. The cotton or thread should first be boiled in a solution of alum. The leaves of artichoke (*Cynara*) also dye a yellow color; see "*Rhus*." Fumigation with tobacco smoke, syringing with tobacco water, and washing with strong lime water, are requisite for destroying aphides whenever these exist in such swarms as to make a copious discharge of honey-dew. Wilson's Rural Cyclopœdia, Art. *Aphis*.

Drying Peaches.—Several modes of affecting this are pursued. When done in-doors, furnaces should be placed in the cellar, from which the heated air may rise into the building suitably provided with shelves, etc.

In some of the Southern States, says Mr. Kenrick, the process is facilitated by a previous scalding. This is effected by immersing baskets of the fruit a few minutes in kettles of boiling water. They are afterward halved, the stones separated, and being laid with the skins downward, the drying is effected in the sun in three days of good weather. They then may be stored in boxes.

In France, as we are informed, peaches and other fruits are thus dried whole: The peaches or other fruits, being pared, are boiled for a few minutes in a syrup consisting of one pound of sugar dissolved in three quarts of water, and after being drained, by being laid singly on board-dishes, they are placed in the oven after the bread is taken out, and when sufficiently dry they are packed in boxes. The following is the mode of drying practiced by Mr. Thomas Bellangee, of Egg Harbor, New Jersey: He has a small house provided with a stove, and drawers in the sides of the house lathed at their bottoms, with void intervals. The peaches should be ripe, and cut in two, not peeled, and laid in a single layer on the laths, with their skins downward, to save the juice. On shoving in the drawer, they

are soon dried by the hot air produced by the stove. In this way great quantities may successively, in a single season, be prepared, with a very little expense, in the preparation of the building and in fuel.

The following may be adopted for preserving peaches in cans, by which they keep well and retain the flavor: Add half a pound of sugar to each pound of peaches. The sugar is put into a preserving kettle, with half a pint of water to every pound of sugar, heated, and the surface skimmed. Into this syrup the peaches, after being pared, are placed and boiled ten minutes. The peaches are then put into the cans while hot and immediately sealed up.

I publish, for the first time, in this edition, a suggestion derived from the observation of Mr. John Commins, a gentleman of much practical experience, which, if it proves to be be true upon further trial, will be of the very greatest advantage to the whole country, as it will enable us to add largely to the production of our fruit trees. This a method to prevent the immense destruction by insects of the fruit of the peach. It consists in interspersing by planting among the trees alternately China berry or Pride of India trees, (*Melia azederach.*) The gentleman who communicated the observation to me has noticed that peach trees shaded by this tree were never infested by the aphis. Their preventive effect may depend upon the roots, or more probably upon the berries of the China tree covering the ground and proving deleterious to the worm which attacks the peach. The experiment is one easily made as the Pride of India is readily propagated and grows rapidly. Some persons adopt the plan of boring a hole in fruit trees and inserting calomel, which is said to be successful.

The gum which exudes from the peach, plum or cherry, answers the purpose of gum arabic in increasing the brilliancy of starch; also in sealing envelopes. Peach leaves are used as a substitute for hops in making yeast biscuits for bread, and the leaves are often dried and powdered to flavor tobacco, to increase its bulk, and to diminish its strength. The leaves are cited by M. Dussauce in his Treatise on Tanning, Philada., 1867, as among those employed for Tanning Leather.

BUFFALO-BERRY TREE, (*Shepardia magnoides*, N.) Mo. Nuttall. I do not know the family of the plant.

The fruit, resembling currants, of a fine scarlet color and growing in clusters, have a rich taste, and are considered valuable for making into tarts and preserves. Farmer's Encyclopœdia.

LUGUMINOSÆ OR FABACEÆ. (*The Bean Tribe.*)

The sub-orders are distinguished by nutritive, purgative and astringent properties.

YELLOWWOOD, (*Cladrastis tinctoria*, Raf., *Virgilia lutea*, Mx.) Hill-sides, Tennessee and Kentucky.

The wood is yellow and dyes a beautiful saffron color.

JAMAICA DOGWOOD, (*Piscidia erythrina*, L.) S. Florida. Chap.

The piscidia is said to be used in America for stupefying fish, which are taken as readily by this means as with *nux vomica*. Wilson's Rural Cyclopœdia. It yields a highly narcotic and diaphoretic tincture. Griffith. The powdered bark relieves toothache.

To the above, which was contained in the first edition of this work, I add the following from the 12th Ed. of the U. S. Disp.: Dr. Wm. Hamilton, of Plymouth, England, in a communication to the Pharm. Journ. iv, Aug., 1844, speaks of this plant as a powerful narcotic, capable of producing sleep and relieving pain in an extraordinary manner. When a resident of the West Indies he had observed its effects as a narcotic in taking fish of the largest kind. He was induced to try it as an anodyne in toothache, and he found a saturated tincture exceedingly efficacious, not only affording relief when taken internally, but uniformly curing the pain when introduced upon a dossil of cotton into the carious tooth. The bark of the root to be effectual, should be gathered during the period of inflorescence in April. When chewed, it has an unpleasant acrimony like mezereon. It yields its virtues to alcohol, but not to water. He prepared the tincture by macerating an ounce of the bark in coarse powder, in four fluid ounces of rectified spirit, for twenty-four hours, and then filtered it. The dose is a fluid drachm. He first tried it on himself, when laboring under severe toothache, taking the quantity mentioned in cold water on going to bed. He first felt a violent sensation of heat internally, which gradually extended to the surface, and was followed by profuse perspiration

some and nutritious. Fl. Scotica, of Lightfoot. Some are said to produce vertigo and tympanites in cattle which feed on them.

RABBIT-FOOT; FIELD CLOVER, (*Trifolium arvense*, Linn.) "Grows sparingly in the upper districts." Collected in St. John's, Charleston District; Newbern. Fl. April.

Wade's Pl. Rariores, 56. Dickerson observes that the dried plant is highly aromatic, and retains its odor. It has been used in dysentery. Withering, 636; Fl. Scotica, 406.

WILD BUFFALO CLOVER, (*Trifolium reflexum*.) Upper districts; vicinity of Charleston; collected in St. John's; N. C.

It affects very sensibly the salivary glands. I have noticed horses in Virginia violently salivated from eating this or other plants.

WHITE CLOVER, (*Trifolium repens*, L.) Vicinity of Charleston; collected in St. John's; Newbern. Fl. May.

Ell. Bott. ii, 201. This also affects the salivary glands, sometimes producing complete salivation. Fl. Scotica, 404. Its leaves are a good rustic hygrometer, as they are always relaxed and flaccid in dry weather, but erect in moist and rainy.

MILK-VETCH, (*Astragalus*.) There are five species of this genus within our limits. I refer to them because the seeds of *A. boeticus*, planted in Germany and England, are found to be the very best substitute for coffee yet tried, and so used—roasted, parched, and mixed with coffee. Our species of *Vicia*, tare, vetch, and *Lathyrus* should also be tried.

EDIBLE PSORALEA, (*Psoralea esculenta*.) The bread root, growing in Missouri, is eaten by the inhabitants of the plain, and the Rocky Mountains. Rural Cyclopœdia.

CAROLINA WILD INDIGO, (*Indigofera Caroliniana*, Walt.) Grows in dry soils; vicinity of Charleston; collected in St. John's Berkeley; Newbern. Fl. May.

Not inferior, says Nuttall, to the cultivated indigo. It does not, however, possess so much coloring matter. The decoction of the leaves is said to act as an emetic when given in large quantities; in smaller doses it is cathartic. "F. I. S.," a correspondent of the Charleston Mercury, says: "Our country ladies gather *wild indigo*, and ferment from it a blue powder equal to the commercial indigo, which dyes a beautiful and lasting blue. A solution of this powder in water is a speedy and certain relief for cramp and asthma. The *red sumach* dyes a

rich dark or light purple, as is required." See Wild Indigo, (*Baptisia.*)

Indigofera anil, L. Introduced.

Formerly cultivated and employed in the manufacture of indigo.

INDIGO, (*Indigofera tinctoria.*) Introduced. Once cultivated in South Carolina to a large extent; see *Indigofera anil.* Collected in St. John's Berkeley. Fl. June.

Drayton's View of South Carolina; Mérat and de L. Dict. de M. Méd. iii, 601. According to Laennec, the decoction of the root possesses the property of acting against poison, and is useful in nephritic diseases. In Jamaica, it is employed to destroy vermin. The leaves are alterative, and are given in hepatic disorders. Ainslie, Mat. Med. Ind. i, 180; ii, 33; Journal de Botanique, v, 11; Ann. de Chim. lxviii, 284; M. and de L. Supplem. 1846, 383; Martius, Syst. Mat. Med. 126; Perollet, Mém. sur la culture des indigofères tinctoriaux, Paris, 1833; L'Herminier, Résumé des obs. faites sur plusieurs espèces indigofères de Guadeloupe; see Journal de Pharm. xix, 257; A. Saint Hiliare, "Hist. of Indigo, from the first account of it till the year 1833," (Ann. des Sci. Nat. vii, 110;) Mem. on Indigo, in the Comptes Rendus Hebdom. of Acad. Nat. Sci. 19th Dec. 1836, 445; Dumas' Mem. upon Indigo, its Composition, etc., in the Journal de Chim. Med. iii, 66, 1837; D. Erdmann, Rech. upon Indigo, (in French, also,) in the 26th vol. Journal de Pharm. 460, 1840, and the report upon the proposed extraction of indigo from *Polygonum tinctorium.* See Journal de Pharm. xxxvi, 274. Indigo itself has acquired some celebrity in the treatment of epilepsy—results doubtful, as large quantities may be taken—an electuary or syrup was used. Dungl. New Remedies, 361. Griffith. See, also, Roth in Pereiras Mat. Medica. The remains of the indigo plantations, with the vats in which indigo was prepared, are still to be seen in the lower districts of South Carolina, bordering on the Santee River. Since the introduction of cotton and rice it is cultivated, though not very largely.

On the cultivation, preparation, etc., of indigo, Woad, (*Isatis tinctoria,*) see Chaptal's Chemistry applied to Agriculture, p. 295; Ure's Dictionary of Arts, Manufactures, and Mines, articles "Indigo," "Calico Printing;" also, Penny Cyclopœdia. I must content myself simply with a reference to the source of

information. The *I. anil* is also used for the production of indigo. The So. Cultivator, vol. ii, p. 58, contains a full account of the preparation of indigo. To avoid the deleterious effects of fermented indigo, Dr. Roxburg, of India, states that he succeeds perfectly by the "scalding process." This is doubted. See, also, Southern Cultivator, p. 15, vol. 6, report of a Committee of the Georgia Agricultural Association. They recommend the *Indigofera argentea*, or wild indigo of Georgia, which is not included by Chapman in his Fl. of So. States. I insert the following.

The directions for preparing I obtained, many years ago, from an old and respectable planter in South Carolina. The manuscript which he delivered to me was from the pen of one who had been extensively engaged in the cultivation and preparation of indigo for market, before the Revolution. It has never been published; and may, therefore, impart information on a process little known by the present generation:

"The pigment, or dyeing substance of the indigo, is obtained from the leaves. There are several species of this plant. The French indigo, *Indigofera tinctoria*, yields the greatest quantity, and is cultivated in India; but the quality is inferior to the *Indigofera argentea*, or wild indigo. The former is distinguished by its pinnate leaves, the smaller ribs expanding from the principal rib like the feathers of a quill, similar to the leaves of the pear and of the lime tree, and by a more slender, ligneous stem. It rises, in a rich soil, and when well cultivated, to the height of six feet.

"The seeds are sown as early in the spring as the climate and season will warrant. In the West Indies, the planting commences in March, in trenches about a foot asunder; and the weed is cut down in May. In South America, six months elapse before it can be cut. In the former, generally four cuttings are obtained of the same plant in the course of a year; but in the latter, never more than two, and often only one. The cutting takes place when the plant is in blossom, and is done with the sickle. Fresh plantings of the seed are required yearly.

"Commence the cutting of the weed in the evening, in time to have the steeper set before it is dark. The plants are laid in strata, and pressed down by weights. When a sufficient quantity of them are laid, pour in water to the height of about four

inches above them. One inch and a half above the surface of the water bore a hole through the side of the vat, and directly over the trough which is to convey the liquor into the beater. When the fermentation has commenced the liquor will rise and run over. Let it remain until the stream has ceased, or nearly so. This, in hot weather, will be from ten to fourteen hours after the water has been poured upon the weed, or on the following morning. *Immediately* draw off into the beater, and commence the agitation. Continue this for about twenty minutes, and then let in the lime water until you have plenty of grain, but not very coarse. The agitation must be carried on, and frequent use be made of the plate. As soon as a change in the color is perceived, from a muddy green to a purple or blue, the beating should cease. This operation usually requires an hour. There can be no certain rule as to the quantity of lime water to be used, or the length of time for continuing the agitation. If the indigo be not sufficiently steeped, it will require more lime water, and longer beating, and *vice versa.* Having obtained the fine blue tint you wish, stop the agitation, and pour in an additional quantity of lime water, which will cause the grains to collect and settle in a short time. Be careful, however, not to add so much as to give the liquor a yellow or red tinge: it should be of a clear, but pale green. As the sediment subsides, commence drawing off the water through the upper plugs, and so on to each successively, until the mud alone remains at the bottom of the vat or beater. In the evening this should be removed into the drainer, and by the morning following it will be well drained and cracked, which it should be before it is taken out. Having first pressed out the water remaining in it, work up the mud; give it a second pressure, and work it up again until it becomes stiff. After this, submit it to a third pressure, for cutting. Should your indigo incline to mould on the drying-boards, as it is apt to do in rainy or damp weather, the mould must be wiped off; otherwise it may turn to a gray color. Let it remain upon the drying-boards until you plainly see the quality; afterward it may be put up in small barrels. In continued damp weather, during the manipulating and drying process, put the greenish indigo in the sun, and turn it frequently. As soon as it begins to crack, take it in.

"Good indigo is known by its lightness, or small specific

gravity, indicating the absence of earthy impurities; by the mass not readily parting with its coloring matter, when tested by drawing a streak with it over a white surface; but above all by the purity of the color itself. The first quality, esteemed by this last test, is called, in commercial language, *fine blue;* the next, *ordinary blue;* then *fine purple*, etc. The most inferior is known as *ordinary copper*."

The most satisfactory information can be got in the Patent Office Reports, and from Mr. Spalding, Liebig, Chaptal, the Encyclopœdia, etc., etc. Several varieties are cultivated. The *Indigofera disperma* is used in Guatemala, and makes the best and most beautiful article. The *Indigofera tinctoria*, formerly cultivated in South Carolina and Georgia, is the most productive, and the increase in quantity will make up the deficiency in price.

The following is the account of the method of cultivating and manufacturing indigo, furnished by Mr. T. W. Glover, of Orangeburg, S. C., and published by Mr. Tuomey, in his Geology of S. Carolina, 1848:

"Indigo was planted in South Carolina at any early period, and was extensively cultivated, and constituted an important item in the exports of the colony, till rice, in the lower country, and cotton, almost everywhere, superseded it.

"In Orangeburg District it has never been abandoned, and the following exhibit will show the number of acres planted, and the amount made in three several years:

Years.	Acres planted.	Amount made.
1831	953	27,700 lbs.
1841	1,091	34,150 lbs.
1842	1,337	35,935 lbs.

"The average production per acre, therefore, was 29 lbs. in 1831, 31 lbs. in 1841, and 26 lbs. in 1842. Some planters, however, in 1842 made upwards of 60 lbs. per acre.

"The price of Carolina indigo varies from 40 to 80 cts., and much of it is vended in the interior or in the neighboring States. Light and sandy land, which will not yield more than 500 lbs. seed cotton per acre, is generally appropriated to this culture, the better soils being reserved for cotton.

"Two species of indigo have been cultivated here—the tame, which is an annual plant, and the wild, which is septennial. The

latter, reproducing seven years successively and affording a better and finer dye, has almost entirely supplanted the former.

"The seed is planted about the 15th April, in trenches eighteen inches asunder, made sometimes with the plow, and it is afterward worked with the hoe. The wild indigo may be cut once during the first year, but it is frequently not touched till the second. The ground is hoed over every subsequent year, about the last of March, and before the plant appears. One bushel of seed is enough, and is used for four acres planted in drill. The weed is cut (after the first year) twice annually, early in June and again in September; and the hoe is used, even after the second cutting, that the land may be left free of grass.

"*Manufacture.*—Three vats or tanks, made of wood, and water tight, are employed in the manufacture of indigo. First, the steeper, which is sixteen feet square and twenty-six inches deep; second, the beater, sixteen feet by twelve, and four feet deep; and third, the lime vat, which is ten feet square and three feet deep, into which is put two bushels of lime, and, in the process of manufacturing, one-half bushel is added to each subsequent vat made. When the plant begins to bloom, it is cut with hooks, early in the morning, and two wagon loads are put in the steeper, which is filled with water by pumps, or, if the locality admits, by troughs from a hill-side. Laths are placed over the weed, which is entirely immersed under the water, where it remains until sufficiently steeped. The indications by which the sufficiency of the steeping is judged are various, and mainly depend on experience. If the fermentation stops, or the leaves cease to be brittle, or the water subsides, it is drawn from the steeper into the beater, the former being elevated above the latter to admit the free passage of the liquid through troughs. When in the beater, a wheel, with arms placed on a shaft, is used to stir and agitate the liquid for about fifteen minutes. Lime water is then added from the lime vat till a cloudy hue appears; with an addition of lime water, it is again agitated thirty or forty minutes, until granulation begins. After beating, or this process of agitation, the liquor remains at rest about four hours, when, from its affinity for and combination with the lime, and from its greater specific gravity, the dye stuff is precipitated and the liquid is drawn off. The drug

deposited at the bottom of the beater is then collected and removed into a box five feet square and fourteen inches deep, called the drainer, which is placed on a bed of sand, and inside of which, and in contact with the sand, is a coarse cloth, (cotton osnaburghs.) From the drainer the indigo is placed in a box three feet long and fourteen inches wide, called the press, in which a stout cloth is also put and folded over the indigo. It is then pressed until sufficiently dry, and cut into pieces about two inches square, which are placed separately for several days, and then put into barrels for the market.

Culture and Manufacture of Indigo.—A writer under the signature of "Oconee" says: "The soils best adapted to it are the rich, sandy loams, though it grows on most lands moderately well, provided they are not wet. The ground should be well broken, and kept light and free from grass by the plow. The nature of the manure used exerts a great influence upon the quantity and quality of its coloring principle. Those substances that act as stimulants to vegetation, such as lime, poudrette, ashes, etc., etc., favor the growth of the plant without injuring the coloring matter. When barn-yard manure has been largely used, a crop of grain should first be raised on the land.

"The seed should be mixed with ashes or sand, and sown in drills fourteen inches apart, four quarts of seed to the acre. In this climate, (Middle Georgia,) the seed should be sown the first of April. When it first comes up it should have the grass picked out with the hand. When an inch or two high the grass between the rows should be cut out with the hoe or scraper, and the soil loosened about the roots. Three weedings are enough before the first cutting, which should commence as soon as the plant throws out its bloom. It is so easily injured by the sun after being cut, that the operation should be commenced and end in the afternoon. After cutting with the reap-hook, it is put under the shed until it can be put in the vats. In Georgia, the two cuttings yielded sixty pounds of indigo to an acre, provided the roots were not injured in the first cutting, which, at three acres to the hand, would be one hundred and eighty pounds ($180.) The price varies from 30 cents to $2 25 per pound for the best Guatemala.

"Like other plants, it has its enemies. The leaves are frequently seen covered with yellow spots, owing to some change

in the atmosphere. It often happens that in consequence of a degree of heat and drouth, the plant is not fully developed; the leaves are not more than one-third their proper size, yet exhibit all the properties of a perfect plant. If the plant is cut in this imperfect state the crop is lost, for the indigo is not well developed. An insect (the flea) often destroys the first crop of leaves. Next, a louse destroys the plant later in the season; this, however, is not so bad as the first. The cutworm also commits some depredations upon it.

" *Manufacturing Process.*—Two methods are used, the cold and the hot. The cold is the safest; the plant must be in a certain state to use the hot.

"1st. *By Cold Water.*—The weed is put in the vat and covered with clear water, where it remains until the color of the liquid becomes a light olive; this is about ten hours; the weed must be pressed down by heavy scantling laid upon it. Draw the liquid off into the churn or beater. The churning must now be commenced, and kept up until the fluid becomes lighter in its general shade, and the blue fecula are seen in the water; which sooner begins from small quantities of lime water being added from time to time during the process of beating. The quantity of lime water that is used should be not more than one-tenth of the liquid that is in the vat. If the lime water be all thrown in at once, the lime more than saturates the carbonic acid, and the carbonate thus formed will be precipitated, and thus injure the indigo. After the fecula shows itself distinctly in the water, the vat is allowed to be still for four or five hours, then the clear water is drawn off by faucets at different heights, so as to allow the indigo to be precipitated in the bottom.

"2d. *The Hot Process.*—The weed is put in the vat, boiling water is let on so as to saturate the plant, and fully cover it. The weed is kept down by scantling thrown upon it. Allow the water to stand from five to fifteen minutes, according to the effect above mentioned. Draw it off through a faucet and sieve into the beater; repeat until all the coloring matter is extracted; beat or churn as above, omitting the lime water; remainder of the process the same.

" The precipitated indigo still requires some further operations to bring it to a state of perfection, (though it can be dried and sent to the market as it now is.) It contains particles that are

imperfectly oxydated; consequently it has neither the color nor properties of the best indigo. Continued beating would bring these to a proper state; but it would cause the particles first oxydated to imbibe an additional quantity of oxygen, by which the color is too much deepened, and the article would be rejected in commerce as *burnt*. To avoid this, throw over the liquid fecula a volume of warm water double the quantity of the fecula, stirring it all the while; by this means the perfect indigo will be precipitated, the other held in suspension. This water is drawn off, and lime added, etc., as above, by which the green color becomes a yellow brown, and the indigo is rendered insoluble and precipitated. That indigo may be pure and brilliant, it should be twice washed—once in cold, and once in hot water. After washing, allow the fecula to settle, then draw off the water.

"The last purification now is to mix the fecula with another quantity of water, in a vat having several faucets. While it is suspended, the earths are precipitated; draw off while stirring, and allow to settle. The last operation consists in putting the fecula in a coarse bag of hemp or wool, and this bag in an open basket to drain, placing weights upon it until it becomes tightly compressed. These last operations are not requisite if a very common article is to be made; but it is well to follow all the purifications. The increase in price will cover the increase of trouble."

"*Indigo Vat.—Description.*—For every set of ten hands there should be what are called a set of works. These formerly cost about one hundred dollars or more, and were a vat or tank, made of plank two inches thick, well joined. This vat is twenty feet square, stands upon posts four feet from the ground, and is kept tight by wedges driven into the sleepers upon which the plank rests. The vat is three feet deep, and is called the steeper. Alongside of it is another vat, twenty feet by ten, occupying the space between the bottom of the steeper and the ground, into which the water is drawn in which the indigo is steeped when ready to be beat, or churned, as we may say. At the end of this last vat a small tank or cask must be placed, to furnish lime water in the process of beating. Tho liquor is drawn from the steeper by a spigot at the bottom of the vat along the beater. Lengthwise of this is stretched a beam, resting on its upper

ends, and revolving on journals, and furnished with cross arms, to the ends of which are fixed open buckets without bottoms, containing about two gallons each. Two men, standing on this beam, with a handspike fixed to the long beam, alternately plunge the open buckets right and left, thus churning the liquid until it begins to show a blue fecula, which is produced by small quantities drawn from the lime cask."

The following is the method successfully used on the plantations in St. John's Berkeley, South Carolina, to prepare a dye from the wild and naturalized indigo:

"Cut the plant, put in a barrel, and cover with water. In about three days it commences to foam, and it is then ready to *churn;* take out the leaves, and press the liquid out of them. It is then to be whipped up in a churn with a stick made like a dasher. When it foams, a greased feather applied to the surface will check the foam. In order to test whether the process is sufficiently advanced and the blue color extracted, it may be tested in a white plate put in the sunlight; the thickened grounds will be visible. About a quart of strong lye-water, or lime soaked in water, should be first thrown in to *settle* it. This should be done before it is churned. If the coloring substance appears to be sufficiently separated by the test mentioned above, drain the supernatant water carefully away. The remainder or sediment, should be placed in a bag to drain. This contains the indigo. This indigo may subsequently be moulded into cakes. I have seen yarn excellently dyed by it; also wool, which was dyed before it was carded, and made into cloth, (1862.) The woods have been eagerly searched for indigo plants during the recent war.

The following process of manufacturing indigo in small quantities for family use is extracted from the Southern Agriculturist:

"Cut the indigo when the under leaves begin to dry, and while the dew is on them in the morning; put them in a barrel, and fill this with rain water, and place weights on to keep it under water; when bubbles begin to form on the top, and the water begins to look of a redish color, it is soaked enough, and must be taken out, taking care to wring and squeeze the leaves well, so as to obtain all the strength of the plant; it must then be churned (which may be done by means of a tolerably open

basket, with a handle to raise it up and down) until the liquor is quite in a foam. To ascertain whether it is done enough, take out a spoonful in a plate, and put a small quantity of *very strong lye* to it. If it curdles, the indigo is churned enough, and you must proceed to break the liquor in the barrel in the same way, by putting in lye (which must be as strong as possible) by small quantities, and continuing to churn until it is all sufficiently curdled; care must be taken not to put in two much lye, as that will spoil it. When it curdles freely with the lye it must be sprinkled well over the top with oil, which immediately causes the foam to subside, after which it must stand till the indigo settles to the bottom of the barrel. This may be discovered by the appearance of the water, which must be let off gradually by boring holes first near the top, and afterward lower, as it continues to settle; when the water is all let off, and nothing remains but the mud, take that and put it in a bag (flannel is the best) and hang it up to drip, afterward spreading it to dry on large dishes. Take care that none of the foam, which is the strength of the weed, escapes; but if it rises too high, sprinkle oil on it."

Seven or eight species of indigo are found in the United States, most of which grow in the South. The wild indigo, (*Dyer's baptisia,*) common in Pennsylvania and other Middle States, yields a considerable proportion of blue coloring matter of an inferior kind. (Flora Cestrica.) See *Baptisia*, *Amorpha* and *Robinia*.

Blue Dyes.—The materials employed for this purpose are indigo, Prussian blue, logwood, bilberry, (*Vaccinium myrtillus,*) elder-berries, (*Sambacus nigra,*) mulberries, privet-berries, (*Ligustrum vulgare,*) and some other berries whose juice becomes blue by the addition of a small portion of alkali, or of the salts of copper. I shall here describe the other, or minor blue dyes: To dye blue with such berries as the above, we boil one pound of them in water, adding one ounce of alum, of copperas and of blue vitriol to the decoction, or in their stead equal parts of verdigris and tartar, and pass the stuffs a sufficient time through the liquor. When an iron mordant alone is employed, a steel-blue tint is obtained; and when a tin one, a blue with a violet cast. The privet-berries, which have been employed as sap colors by the card-painters, may be extensively used in the

dyeing of silk. The berries of the African night shade (*Solanum guineense*) have been of late years considerably applied to silk on the continent in producing various shades of blue, violet, red, brown, etc., but particularly violet.

I introduce the following general directions, at the risk of some repetition, from an article in the Charleston Courier dated Gowansville, 1862:

First. It is important to cleanse the wool, or other material to be dyed, from grease and all foreign matters which might prevent it from taking the dye. Wool must be well washed in warm soap suds, rinsed in warm water, squeezed as dry as possible, and then put wet into the dye. Cotton and linen must be thoroughly wet in boiling water, and then squeezed or wrung out of it and put into the dye wet.

Secondly. Use a copper caldron for all light and delicate colors, and an iron pot for black and all dark colors. The *shades* of color will be regulated by the strength of the dye, the number of times the article is dipped, or the length of time it remains in the dye.

Thirdly. Many dyes that will color cotton will leave wool and linen untinged, and some that will color wool deeply will dye cotton a very light shade.

Fourthly. What is used for brightening and making the colors durable are called mordants. The mordants used here are copperas, (sulphate of iron,) blue vitriol, (sulphate of copper,) alum, wheat bran, lye, and lime water. Those who cannot obtain copperas, use the water from one of the mineral springs, which is strongly impregnated with iron.

Fifthly. The best seasons for dyeing with bark are the spring and summer, while the sap is in the tree Autumn is the best season for dyeing with leaves, and winter is the season for dyeing with roots, because the sap of the tree then goes into the roots.

Sixthly. Bark and roots must be cut into small pieces; let the caldron be two-thirds filled with the pieces, then fill up with water, and boil for several hours until the color is as deep as desired. If leaves and twigs are used, fill the boiler with them and cover with water. Two or three hours steady boiling will extract the color from bark, roots, and leaves. Then strain off the liquid carefully from the sediment, and put it back into a

clean boiler, add to it the alum or copperas, or both, according to the color desired; let it be completely dissolved and well mixed in the dye, after which immerse the *wet* wool, yarn, or cloth in the dye, and proceed according to the definite directions for each color. By mixing different barks, roots, and leaves together in the same dye a variety of shades of different colors are obtained by those who are skilled in the art of preparing domestic dyes. The following named trees are much used here for dyeing wool and cotton:

Sassafras, (*Laurus Sassafras.*) The bark and roots are used for dyeing *worsted* a permanent and beautiful yellow and orange color. Use a copper boiler and five ounces of alum to one pound of wool or worsted yarn.

Kalmia, (*angustifolia,*) or dwarf laurel, dyes *cotton* a fine drab color. Use a copper boiler. The leaves and twigs of the Kalmia and about one tablespoonful of copperas to three gallons of dye. Scald the cotton material in the dye for twenty minutes, then rinse in cold water and hang to dry in the air.

Willow, (*salix capreata?*) The bark dyes wool and linen a deep blue black, and dyes cotton a dark slate color. Use an iron boiler. For black, three ounces of copperas to four gallons of dye; for slate color, one ounce of copperas is sufficient. Boil in the dye for twenty minutes, rinse in cold water and hang to dry. The dye may be deepened by a repetition of the same process in fresh dye.

Red Oak, (*Quercus sinuosa.*) The bark and roots dye a fine shade of chocolate brown. Use an iron boiler and two ounces of copperas to four gallons of dye. Boil twenty minutes in the dye and rinse in cold water. This dyes cotton. The Spanish Oak dyes another shade of brown.

White Oak, (*Quercus alba.*) The bark dyes cotton lead color. Use an iron boiler; two ounces of copperas to four gallons of dye; scald in the dye twenty minutes and rinse with cold water. Oak bark will not dye wool.

Pine bark, (all the varieties found in our woods,) dyes cotton slate color; combined with the Kalmia, it dyes dove color. For each color, put one ounce of copperas to four gallons of dye, and boil in it for twenty minutes. Rinse the slate color in cold water and the dove color in cold lye.

Sweet Gum bark dyes cotton dove color. Use a copper boiler;

a spoonful of copperas to three gallons of dye, and scald in the dye for twenty minutes; rinse in cold water. To produce *another shade*, rinse the cotton stuff in cold lye-water, and hang to dry in the air.

Guinea Corn, (*Holcus Sorghum.*) The seed dyes *wool* lead color, and will not dye cotton. Use an iron boiler, a little copperas, and rinse in lye.

Maple, (*Acer campestris?*) The bark dyes both wool and cotton a fine dark shade of purple. Use an iron boiler and two ounces of copperas to four gallons of dye; scald in hot dye for twenty minutes and rinse in cold water.

Beach, (*Fagus Sylvatica.*) The bark dyes dove color. Use an iron boiler and one ounce of copperas to four gallons of dye; rinse in cold water, or in lye for another shade.

Sumach, (*Rhus Glabrum.*) The leaves and berries dye black. Use an iron boiler and four ounces of copperas to four gallons of dye. Boil the cotton yarn or cloth in the dye for an hour, and rinse in cold water. (See "Sumach," for dyes without copperas; vinegar and old iron serve the place of copperas.)

Walnut, (*Juglans nigra.*) The bark and roots dye cotton fawn brown and root color, according to the proportion of bark or of roots and copperas used. The leaves boiled into dye color cotton purple and wool black; when used without boiling the leaves dye wool fawn color. The green shells of the full grown nuts dye black, with copperas. What is dyed black must be rinsed in cold water; the cotton to be dyed purple must be rinsed in lye. The fawn, brown, and root color must be rinsed in cold water. The proportion of copperas used for black is two ounces to four gallons of dyé; for the other shades, use much less copperas.

To make a *cold dye* for wool, fill a tub with alternate layers of walnut leaves and wool, then pour on water till all is covered. The next day take out the wool and dry it in the sun, then replace it in another tub with alternate layers of fresh walnut leaves. Strain off the water from the old walnut leaves and pour it over the wool and fresh walnut leaves; let it remain again till the next day. Repeat this process for one week, adding as much water, from day to day, as to make the dye sufficient to cover the wool and fresh leaves. This is a fine, permanent *fawn colored* dye.

Madder dyes *wool* red. Mix four quarts of wheat bran with four gallons of water, and set it to ferment. When it is quite sour, strain off the water and dissolve in it a lump of alum the size of a fowl's egg. Set the liquid on the fire in a copper kettle, and just before it boils mix well into it a half pound of fresh madder for every pound of wool. Then put into the dye the wet wool or worsted stuff to be dyed, and let it remain immersed in the dye for an hour, turning and pressing it frequently; during which hour the dye must be kept very hot, but must not boil, lest the color should be tarnished. When the wool is taken from the dye pot, it must be rinsed immediately in cold strong lye, or in lime water, and then dried.

Spanish brown is used for dyeing cotton red. Put a pound of Spanish brown, powdered, into a little bag, and rub it out in a gallon of hot water till the bag is completely emptied of its contents. Then put the cotton yarn into the painted water, and rub the color into the yarn till all the coloring matter is transferred from the water to the yarn. After which, put two tablespoonsful of linseed oil into the water and boil the yarn in it for fifteen minutes, then hang the yarn to dry. If linseed oil cannot be obtained, boil the painted yarn in new milk for fifteen minutes.

Solferino pink. Cut a piece out of the end of a pumpkin large enough to admit the hand, take out all the seeds and leave the strings in. Mash pokeberries into pulp and fill the cavity of the pumpkin with them, stir them up well with the strings and put the worsted yarn into the mixture, then cover it up close with the piece of pumpkin that was cut out. The next day take out the yarn and dry it in the air; when dry, put the yarn back into the pumpkin as before, and cover it up again till next day. Repeat this process every day till the desired shade of pink is obtained, then rinse the worsted out in cold, strong vinegar, and dry it for use. It will take a week to dye the deepest shade of pink.

Glyceria tomentosa Grows in pine lands. Fl. June.

Mér. and de L. Dict. de M. Méd. 387. In Pondicherry, this is given to horses in place of oats. Mém. du Muséum, vi, 326.

TURKEY PEA; GOAT'S RUE; CATGUT, (*Tephrosia Virginiana*, Ph.) Vicinity of Charleston; N. C.; grows in dry soils. Fl. July.

Lindley's Med. Flora, 244; Griffith, Med. Bot. 238. The roots were used by Indians, and are now employed in popular practice as a vermifuge; a decoction is said to act as powerfully and as efficiently as the pink root, (*Spigelia.*) Attention is invited to it.

Dr. Wood, in the 12th Ed. U. S. Disp., quotes from the Am. J. Pharm., xxviii, 218, an account of the experience of Dr. B. O. Jones, of Atlanta, Ga., with this plant. He used it with advantage as a mild, stimulating tonic and laxative, and he found it especially useful in typhoid fever. He prepares it by boiling eight ounces of the plant with two of *Rumex acutus*, in four quarts of water to a quart, and straining; adding, when the preparation is to be kept, an equal bulk of diluted alcohol or brandy, and half its weight of sugar, and macerating for several days. The dose is one or two tablespoonsful.

BASTARD INDIGO, (*Amorpha fruticosa*, L.) Florida, S. and N. Carolina, and Mississippi.

This was formerly used in Carolina as an indigo plant, and continues to be extensively cultivated in Britain as an ornamental shrub. Wilson's Rural Cyclopœdia.

YELLOW LOCUST TREE; LOCUST; FALSE ACACIA, (*Robinia pseudacacia*, L.) Grows in the mountains of N. and S. Carolina; vicinity of Charleston; collected in lower St. John's Berkeley, near Ward's plantation; Newbern. Fl. May.

Dém. Élém. de Bot. The flowers are aromatic and emollient. An anti-spasmodic syrup is prepared from them; and Gendrin states that when given to infants, it produces sleep, vomiting, and sometimes slight convulsive movements; he relates a case where it was swallowed by boys, in whom acro-narcotic effects were induced. Mér. and de L. Dict. de M. Méd. vi, 101; Desfont, Traité des Arbres, ii, 304; Ann. d'Hort. ix, 168; Ann. Clin. de Mont. xxiv, 68.

Dr. Wood, in the 12th Ed. U. S. Disp., states that the bark of the root is said to be tonic, and in large doses, emetic and purgative, and he reports from the Ann. de Thérap. 1860, p. 64, three cases of poisoning, in children, from eating the root; they all recovered; the symptoms were like those produced by an overdose of Belladonna. One of them who happened to be laboring under intermittent fever at the time, had no return of the paroxysm. He adds, "these facts render caution advisable

in the use of the root, yet are also well calculated to stimulate inquiry." Mills states that "the best bows of the Indians were made of this tree."

The inner bark is fibrous, and may be spun into cordage; the wood is of a fine, compact grain, and is used for manufacturing purposes. Mém. sur la Robinia, Mém. de la Soc. d'Agricult. 1786; François, Letters on the Robinia, Paris, 1803 Griffith, in his Med. Bot. 239, says that it has not received sufficient attention, for "every part is endowed with some good quality." On account of its durability, the wood is much used for tree-nails in ship-building; the leaves, prepared in the same manner as those of the indigo, may be employed as a substitute; they afford an excellent nourishment for cattle, either in the fresh or in the dried state. Willich, Domestic Encyc. i, x. Grossier (Desc. de la Chine) says that they are used by the Chinese to produce the beautiful yellow color so remarkable in their silks. It is prepared by roasting half a pound of the half expanded flowers in a copper pan over a gentle fire, and stirring them continually; after turning yellow, water is poured over, and it is boiled till it acquires a deep color. It is then strained, and half an ounce of alum, and the same quantity of shell lime are added, when the dye is fit for use. It is possible that this author may have confounded this plant with the *R. flava*. Mérat says the flowers furnish a palatable dish when fried. The seeds are somewhat acrid, but afford a large quantity of oil on expression. By infusion in water, they become perfectly mild, and contain an excellent farina.

This tree, both the leaves and flowers of which are beautiful, has attracted great attention in England, and its seeds are largely imported, to be planted as a hedge and ornamental plant, and for various purposes. Almost a mania prevailed upon the subject. "No other tree grows more rapidly than this, excepting some species of the willow and the poplar." A sucker at Chiswick grew twenty feet in one season, with a circumference of three inches. When the tree is felled suckers spring from the trunk in great profusion.

Large quantities are exported to Liverpool for fastening bolts in ship-building. C. W. Johnson and others write of it thus: "The wheelwright and the coach-builder have employed it for axle-trees of carriages; the turner has used it for various pur-

poses of his art, and has been delighted with its smooth texture and beautifully delicate straw color; fence-makers have used it for rail fencing and have found it to stand wet and dry near the ground better than any other timber in common use, and to be as durable as cedar; landscape gardeners have planted it for a combination of ornament and utility. * * Farmers might try it for the formation of hedges, and were they to transplant it from the nursery when it has a height of about four feet, they would find it forming a hedge quite equal in compactness, strength, economy and manageableness, to hedges consisting of tried and approved plants, and a hedge available as a fence far earlier than any other, and capable of being raised to any desirable elevation. The flowers of the acacia tree are used in St. Domingo for making a distilled liquor, and its roots, and leaves, and juices contain a considerable proportion of sugar." Wilson's Encyc. Rural. The plants are easily propagated by pouring boiling water over the beans in the fall; let them remain twenty-four hours and plant. They grow six or seven feet the first season.

The following highly interesting account of this tree, and the mode of cultivating it in the United States, is given by Dr. S. Ackerly:

"The cultivation of the locust tree on Long Island, and in other parts of the State of New York, has been attended to with considerable profit to the agricultural interest, but not with that earnestness which the importance of the subject demands. This may have arisen from the difficulty of propagating it by transplanting, or not understanding how to raise it from the seed. * * * * * *

"The locust is a tree of quick growth, the wood of which is hard, durable, and principally used in ship-building. To a country situated like the United States, with an extensive line of seacoast, penetrated by numerous bays and giving rise to many great rivers, whose banks are covered with forests of extraordinary growth, whose soil is fertile, rich and variegated, and whose climate is agreeably diversified by a gradation of temperature; to such a country, inhabited by an industrious and enterprising people, commerce, both foreign and domestic, must constitute one of the principal employments. As long as the country possesses the necessary timber for ship-building,

and the other advantages which our situation affords, the government will continue to be formidable to all other powers. We have within ourselves four materials necessary for the completion of strong and durable naval structures. These are the *live-oak, locust, cedar and pine*, which can be abundantly supplied. The former is best for the lower timbers of a ship, while the locust and cedar form the upper-works of the frame. The pine supplies the timber for decks, masts and spars. A vessel built of live-oak, locust and cedar, will last longer than if constructed of any other wood. Naval architecture has arrived in this place, and other parts of the United States, to as great perfection, perhaps, as in any other country on the globe. Our 'fir-built frigates' have been compared with the British oak, and stood the test; and in sailing, nothing has equalled the fleetness of some of our sharp vessels. The preservation and cultivation of these necessary articles in ship-building is a matter of serious consideration. It might not be amiss to suggest to the Congress of the United States to prohibit the exportation o them. The pine forests appear almost inexhaustible, and the will be so in all probability for many generations to come; bu the stately cedars of Mobile and the lofty forests of Georgia, where the live-oak is of a sturdy growth, begin to disappear before the axe of the woodsman. The locust, a native of Virginia and Maryland, is in such demand for foreign and domestic consumption that it is called for before it can attain its full growth. It has been cultivated as far eastward as Rhode Island, but begins to depreciate in quality in that State. Insects attack it there, which are not so plentifully found in this State, nor its native situations. These give the timber a worm-eaten appearance and render it less useful. The locust has been extensively cultivated in the southern parts of the State of New York, but the call for it has been so great that few trees have attained any size before they were wanted for use. Hence they are in great demand, and of ready sale, and no ground can be appropriated for any kind of timber with so much advantage as locust. Beside its application to ship-building, it is extensively used for fencing; and for posts, no timber will last longer, in or out of the ground. On Long Island, where wood is scarce and fencing timber in great demand, the locust becomes of much local importance from this circumstance alone, inde-

pendent of its great consumption in this city among ship-builders. In naval structures it is not exclusively applied to the interior or frame. In many places where strength is wanting, locust timber will bear a strain which would break oak of the same size. Thus an oak tiller has been known to break near the head of the rudder in a gale of wind, which has never happened with a locust one. Tillers for large sea vessels are now uniformly made of locust in New York. It is the best timber also for pins or tree-nails, (commonly called trunnels,) and preferable to the best of oak. The tree generally grows straight, with few or no large limbs, and the fibres of the wood are straight and parallel, which makes it split well for making tree-nails, with little or no loss of substance. These are made in considerable quantities for exportation.

"The locust tree does not bear transplanting well in this part of our country, but this in all probability arises from the custom of cutting off the roots when taken up for that purpose. Most of the roots of the locust are long, cylindrical and run horizontally not far under the surface. In transplanting, so few of the roots are left to the body of the tree removed that little or no support is given to the top, and it consequently dies. If care was taken not to destroy so much of the roots a much larger proportion of those transplanted would live and thrive. So great has been the difficulty in raising the locust in this way that another method of propagating it has been generally resorted to. Whenever a large tree was cut down for use, the ground for some distance around was plowed, by which operation the roots near the surface were broken and forced up. From these roots suckers would shoot up, and the ground soon become covered with a grove of young trees. These, if protected from cattle by being fenced in, would grow most rapidly, and the roots continuing to extend, new shoots would arise, and in the course of a few years a thrifty young forest of locust trees be produced. The leaves of the locust are so agreeable to horses and cattle that the young trees must be protected from their approach. When growing in groves they shoot up straight and slender, as if striving to out-top each other, to receive the most benefit from the rays of a genial sun.

" Another difficulty has arisen in propagating the locust from inability to raise it from the seed. The seed does not always

come to perfection in this part of the State of New York, and if it does, it will not sprout, unless prepared before planting. The method best adapted to this purpose was proposed by Dr. Samuel Bard; but it is not generally known, or if known, is not usually attended to. When this shall be well understood and practiced, the locust will be easily propagated, and then, instead of raising groves of them, the waste ground along fences and places where the Lombardy poplar encumbers the earth will be selected to transplant them, as by having them separated and single there will be an economy in using the soil, the trees will grow much better, and the timber be stronger.

On account of its rapidity of growth and its use in making cross-ties on railroads, I would suggest that it be planted along railroad embankments for this purpose.

ROSE ACACIA, (*Robinia hispida;* also, *Va. rosea.*) Mountains of Georgia and North Carolina. Chapman.

Wilson speaks of it as a "remarkably beautiful shrub." Its shoots of each year, or newest and freshest twigs, carry the flowers; so that its old wood may be annually pruned away to any extent which the taste of the cultivator or the situation of the plants may require. The flowers are large, odorless, and of a beautiful rose color. See, also, nearly all the English and Scotch authorities.

"Dr. Bard's method of preparing the seeds was to pour boiling water on them, and let it stand and cool. The hard, outer coat would thus be softened, and if the seed swelled by this operation, it might be planted, and would soon come up."

CLAMMY LOCUST, (*Robinia viscosa*, Vent.) Grows among the mountains of S. and N. C., and in Georgia. Fl. May.

Mér. and de L. Dict. de M. Méd. vi, 101. The young branches afford an abundant, glossy exudation, secreted by little superficial glands, which is dissolved by ether; Vauquelin considers it a peculiar product: An. de Chim. xxvii, 223. Chevalier, however, doubts it: Dict. des Drogues, iii, 15.

JAPAN CLOVER; WILD CLOVER, (*Lespedeza striata*, Hooker and Arnott.) Introduced; Miss. to N. C.

This plant has recently (1868) attracted great attention as a new forage plant, springing up everywhere and attracting universal inquiry from farmers and planters in every portion of the Southern country. I have received letters from a number of

persons asking for information concerning it, as it seemed to take the place of other plants, and was greedily eaten by horses, cattle and hogs. It causes slight salivation in the former. It grows abundantly on waste lands, under pine saplings, and drives out joint, nut and Bermuda grasses. It is a mistake to suppose, however, that it is of recent introduction, as my friend, Mr. H. W. Ravenel, of Aiken, S. C., had noticed it in St. John's Berkeley, S. C., many years since, and I had sent him specimens from Fairfield District, S. C., fifteen years ago. Mr. R. having ascertained that it was a Lespedeza has recently obtained the specific name from Prof. Gray, and the former, in an article written in the Aiken Press, first proposed the name Japan Clover for it, as it is a native of that distant country. Dr. Jno. Bachman has also made it the subject of a communication in the Charleston Courier.

It covers the earth as with a carpet of green; it is highly nourishing and has proved a great acquisition to our people. The seed is not winged, and it must be rapidly propagated through the instrumentality of animals. See, also, Dr. L. E. Berckman's paper before the Agricult. Club of Augusta, Ga., 1866. I introduce the following slip as a specimen of numerous notices concerning the plant. It is from the Laurensville (S. C.) Herald:

"*Wild Clover.*—A new grass, which is generally called in this section by the name of Wild Clover, is springing up luxuriantly all over this district, and, we see from our exchanges, all over the Southern States. It grows almost everywhere, and seems to take hold even on the washed and galled parts of land, as if it would redeem both the looks and fertility of the country. It appears to be a dwarf clover, is very thick set, and covers the earth with a beautiful carpet of green. We have heard that a single root sends out as many as six hundred branches. It is much relished by cattle, and is said to be exterminating the Bermuda, Joint, Sedge, and all other grasses. We see that it is attracting much attention in Middle Georgia."

A friend in Orangeburg writes: "The plant grows best on a rich clay soil, but does well on sandy lands—and even in the shade, up to the roots of trees, but is not seen on lands worked within a year or two. It sometimes grows to two feet high. The St. Matthew's planters (where it abounds) speak of it as a

blessing, as fodder has been scarce, and it puts out very early, and cattle and horses are fond of it; although, like Clover, it salivates them at first. I have a lawn with a number of mules and cattle feeding on it; but like rye they do not appear to destroy it."

Mr. Ravenel has published an article on this plant in "The Land we Love," 1868, January and February. I have examined the roots, which are long and fibrous, and which penetrate and flourish even in sandy roads and in yards. The seed should be gathered for sale.

DOLLAR-PLANT, (*Rhyncosia tomentosa ?*) Diffused in dry pine lands.

This plant, receiving its name probably from the shape of the leaf, is reputed, in the neighborhood of Aiken, S. C., and elsewhere, to be a valuable agent in arresting troublesome diarrhœa. A tea is given several times a day. Several cases have come to my knowledge where it was successfully employed—no doubt on account of the tannin contained in it, as is evident from the taste.

TARE, (*Vicia sativa*, Linn. Walter.) Grows abundantly around Charleston. N. C. Fl. June.

In England, a decoction of the seeds in water is used as a sudorific in small-pox and measles. The seeds are a good food for pigeons. Fl. Scotica, 396; Mér. and de L. Dict. de M. Méd. vi, 892.

GARDEN BEAN, (*Vicia faba.*) Cultivated.

Pisum sativum. Pea.

Great use is made of the varieties of the pea on our plantations in South Carolina, as articles of food for men and animals. The species called the cow-pea is most in use. I have been unable to find any accurate botanical description of this very valuable plant. It seems, however, from my examination, to be included under the genus *Vicia.*

A soup made of the cow-pea, which is a very common dish at the South, is much used by nursing women to increase the amount of milk, as it is believed to be endowed with some special virtues as a galactagogue. It failed completely in a case where I had it used most assiduously. See, also, castor oil plant.

David Dickson, one of the most successful planters in Georgia, in his letters, republished in So. Cultivator for January, 1869, says that the chief thing added to the soil by a clover crop, are carbon and ammonia. "In the South the cow-pea will answer the same end, if sown early, manured with two hundred pounds of Peruvian Guano, and turned under from the 1st of July to the 1st of August; then at the same time seeded again with peas, using one hundred pounds guano. Feed off with hogs and beef cattle, which will generally pay for all expenses, and leave the land twenty dollars better. * * All acknowledge the importance of turning under *green* crops. The only thing lost by their drying is their ammonia." "The farmers of the Northern States are improving their lands almost entirely by increasing their supplies of ammonia, growing hay, clover, oats and rye, and keeping stock to eat these crops annually; not gaining but losing phosphates and gaining nitrogen—making the land rich, and the land making the owner rich. Ammonia is the foundation of English agriculture. Ammonia from the atmosphere, ammonia from Peruvian Guano, ammonia from the turnip, hay and clover, etc., returning merely the bone earth to the soil, which has been extracted by ammonia, which last is constantly increasing in its relative amount."

Amphicarpa monoica. Grows in rich lands. Fl. July.

Ell. Bot. Med. Notes, ii, 322. The subterranean pod is cultivated as a vegetable.

GROUNDNUT; PINDAR; PEANUT; GOOBERNUT, (*Arachis hypogæa.*) Brought by the negroes from Africa. Fl. May.

Mér. and de L. Dict. de M. Méd.; Supplém. 53, 1846. The fruit preserves its germinative powers for forty years. Boudich Excurs. 392. Large quantities are exported from Senegal on account of the oil which is expressed from them, and which is much valued. Ermandel "on the cultivation of the groundnut, and its employment as a substitute for coffee," Journal de la Littér. Étrang. ix, 169; Du Buc, Mem. on the use of A. hypog., and an examination of its oil, (in French;) see Journal de Pharm. viii, 231; Rivoli, Lettre sur l'Arachis hypogæa, Milan, 1807; Donmen, Notice sur l'Arachis, Montpellier, 1838. According to the analysis of Pagen and Henry, it is very difficult for the oil to become rancid. Journal de Chim. Méd. i, 435;

Ann. de Hist. Nat. iv, 206; Gurnin, Mém. sur l'Arachis, Biblioth. Physice Ècon. i, 145; Tessier, Mém. sur l'Arachis, Avignon. The seeds, parched and ground, can with difficulty be distinguished from coffee, as I have myself experienced. In some portions of South Carolina it is employed as a substitute. The okra (*Hibiscus esculentus*) serves the same purpose.

In a letter from Mr. W. G. Simms, dated Woodlands, 1863, he writes as follows:

"You speak of the groundnut as a substitute for coffee. But as coffee it is a very inferior thing to its use as chocolate. The manufacture of chocolate cakes out of the groundnut alone and without a particle of cocoa, is an immense and most profitable part of Northern manufacture. We make it in my family of a quality not inferior to any you buy. To prepare it for the table it is beaten in a mortar. At the North, I have been told that the hulls are ground up with the nut, and I do not doubt that this is an improvement as qualifying the exceeding richness of the nut, which I have usually found too rich prepared as chocolate in our way."

The groundnut and *bené* make rich and nutritious soup, and act as substitutes for meat. They are often parched, and beaten up with sugar, and served as a condiment or dessert. The groundnut is cultivated to some extent in the Southern States, and great use is made of it on the plantations as an article of food, and for various domestic purposes; it is exported with profit, but troublesome to prepare. I am not aware of any use being made in the Carolinas of the oil which it affords on expression. The authorities cited above will afford much valuable information.

The above was published in my report on Med. Botany of S., 1849. Since the war it is largely employed. The superintendent of the Rockfish Factory in North Carolina, writes that he has "used the peanut oil by the side of the sperm, and that it works fully as well."

The N. C. Advertiser publishes the following: "The vine, when the pea is removed, makes an excellent forage for cattle, said to be equal to the best Northern hay. From the nut is expressed a valuable oil. During the war this oil was extensively used in our machine shops, and its lubricatory properties are pronounced by competent authority to be superior to those

of whale oil, for the reason that it does not gum at all. One quality of the oil is extensively employed in the composition of medicines; another is used for burning purposes, and possesses the virtue of not smoking, while a third makes a really excellent salad condiment. Such, and so varied and important, are the uses to which this simple product can be devoted—uses which the uninformed, who have, perhaps, regarded it only in the light of an indigestible bulb, would never suspect to proceed from its cultivation."

The oil was expressed by screw pressure by parties near Manning, S. C. Mr. Dyson obtained three quarts of oil from a bushel of the nuts.

Dr. Wood states that it is a non-drying oil and will not do for painting, but is used for various purposes in the arts, for lubricating machinery and in the manufacture of woollen cloth; and would serve, adds Dr. Wood, for burning in lamps, giving even a better light than sperm oil. Am. J. Pharm., July, 1860. U. S. Disp., 12th Ed.

SWEET LOCUST; HONEY LOCUST, (*Gleditschia triacanthus*, L.) Diffused. As far west as Mississippi; I have seen it in the lower and upper districts of South Carolina; N. C.

Beer is sometimes made by fermenting the sweet pods while fresh. The pores of the wood are very open. When perfectly seasoned, the wood is extremely hard. It is far inferior to the black walnut or wild cherry for cabinet-making. Hedges of it are rendered impenetrable by its long thorns. Michaux, in Farmer's Encyc. Mills' Statistics of S. C.

WILD SENNA, (*Cassia Marylandica*, L.) Grows along the banks of rivers; vicinity of Charleston; N. C. Fl. July.

Frost's Elems. Mat. Med. 135; Griffith's Med. Bot. 261. It is said to be as safe and as certain in its operation as the imported senna, but more apt to gripe; this may be corrected by infusing fennel seed or some other aromatic with the leaves. It is prepared in large quantities by the Shakers, and is generally collected after the seeds ripen; one ounce of the leaves is added to one pint of hot water, of which the dose is one to three ounces, repeated. I have specimens of the leaves of the officinal senna, which is cultivated successfully by Mr. W. Lucas, of South Carolina, for use on his plantation. He says that it does not appear to degenerate.

STYPTIC WEED; FLORIDA COFFEE, (*Cassia occidentalis*, L. *Cassia Caroliniana*, Walt.) Common around old buildings; collected in St. John's; vicinity of Charleston; N. C. It is becoming a pest to the farmer. Fl. July.

Mér. and de L. Dict. de M. Méd. ii, 130; Marcgrave, in his Hist. of Brazil, mentions it as a remedy in the poison of venomous animals and in strangury. In the Supplem. to Mérat, p. 150, 1846, properties are ascribed to it similar to those of the *C. hirsuta*, which is diuretic, acting on the lymphatic system, and employed in obstructions, debility, dropsy caused by derangement of the digestive organs, and as a vermifuge also; forty grains, parched like coffee, are used. It is useful as an application, in the form of a decoction of the leaves, in itch, erysipelatous eruptions, irritation and inflammation of the rectum. The negroes apply the leaves, smeared with grease, as a dressing for sores. Griffith, Med. Bot. 262; Bouditch, Exper. 392; Chernoviz, Form. 222. Once thought to be very valuable as a substitute for coffee; roots said to be injurious to hogs.

GOLDEN CASSIA, (*Cassia chamæcrista*, L.) Diffused in dry, sandy soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Trans. Am. Phil. Soc.; Shec. Flora Carol. 390; Mér. and de L. Dict. de M. Méd. ii, 129. The leaves are said to be purgative. It grows in abundance in South Carolina and elsewhere and should be examined. It is employed in portions of the country for the recovery of worn-out lands; those that are sandy being particularly benefited by it. See Greenway's account of its domestic uses. *Op. ant. cit.*

Cassia tora, L. Diffused in cultivated soils; vicinity of Charleston. Fl. Sept.

Supplem. to Mér. and de L. Dict. de M. Méd. 1846, 150; Ainslie's Mat. Med. Ind. ii, 405. Used in India.

REDBUD; JUDAS TREE, (*Cercis canadensis*, L.) Swamps vicinity of Charleston; collected in St. John's; N. C. Fl. March.

Shec. Flora Carol. 380. "The wood is of great value for mechanical purposes, as it polishes exceedingly well, and is admirably veined with black and green." Mills, in his Statistics of S. C., states that the blossoms are used as a salad.

Pithecolobium unguis-cati, Benth. *Inga unquis-cati*, Willd. S. Fla. Chap. Said to be a good remedy in urinary complaints

and obstruction of the liver and spleen; a decoction of the bark is very astringent. Macfadyen.

SENSITIVE VINE, } *Schrankia angustata*, T, and G. *Schrankia uncinata*, Ell. Sk.

Grows in pine lands; N. and S. C. Fl. July.

The leaves of this plant possess a remarkable degree of sensibility or irritability, closing up immediately upon contact with any surface. I have repeated upon this plant, and in a measure verified the experiments with chloroform and sulphuric ether upon the *Mimosa sensitiva*, made by Prof. Marcet, of Geneva, in illustration of the relations existing between animal and vegetable irritability.* After trying a number of substances, including the tinctures of opium, capsicum and camphor, and the solutions of tartar emetic, sulp. morphine, and hyd. potash, without producing any impression, I ascertained that the two anæsthetic agents alone, when placed on the main petiole of the leaves, had, in about five minutes, their influence gradually extended to those above, causing the leaflets to contract *seriatim*. Though sensibility to impressions was impaired by each successive attempt, yet it was never entirely lost. The result of my observations differed from those of Prof. Marcet, but agreed with De Candolle in his analogous experiments with nitric and sulp. acids, in its not disclosing any impressions transmitted downward, or at any rate beyond the junction of the branch experimented on with the main limb of the plant. A drop of the oil of aniseed placed on a leaf-stalf seemed to have the effect of arresting the transit of any influence beyond it; hence, we may be led to suspect that the impression is conveyed by organs of sensation or of contractility or irritability, arranged not far from the surface. In the examination I was assisted by Dr. René Ravenel.

In sensitive plants, *Mimosa*, for example, the movements of the leaves, says Mr. C. Mackensie, quoted by Wilson, have their origin in certain enlargements situated at the articulation of the leaflets with the petiole, and of the petiole with the stem. If by a longitudinal section the lower half of this swelling be removed, the petiole will remain depressed, having lost the power of elevating itself. If the superior half be removed, the

* Read before the Soc. de Phys. et d'Hist Nat., Oct. 19th, 1840. See, also, Sill. Journal, July, 1849.

petiole will remain constantly elevated, having lost the power of depressing itself. These facts prove that the motions of the petiole depend on the alternate turgescence of the upper and lower half of the enlargement, situated at the point of articulation, and that contractility is not the principle of these motions. The irritation of a burning lens, for example, is felt either above or below. This interior movement, M. Dutrochet found, was transmitted equally well, even though a ring of bark has been removed; that it is transmissible even though the bark and pith be removed, so that nothing remains to communicate between the two parts of the skin except the woody fibres and vessels; that it is transmissible even when the two parts communicate merely by a shred of bark; and that it may be transmitted even when the communication exists by the pith only; but that it is not transmissible when the communication exists only by the cortical parenchyma. From these very interesting experiments, it results that the interior movement produced by irritation is propagated by the ligneous fibres and the vessels. The propagation is more rapid in the petioles than in the body of the stem, the rapidity having been computed. Absence of light during a certain time completely destroys the irritability of the plant. The return of the sun's influence readily restores the plant to its irritable state. "It appears, therefore, that it is by the action of light that the vital properties of vegetables are supported as it is by the action of oxygen that those of animals are preserved; consequently, etiolation is to the former what asphyxia is to the latter." Rural Cyc.

M. M. Bert and Blondeau have been experimenting on the contractions of the Sensitive Plant, as I see by a paper sent me by Prof. Gray, of Boston, (1868.)

M. Blondeau experimented on plants with the induced galvanic current of a Ruhnkorff's coil. He submitted three plants to the influence of the electric current. The first was operated on for five minutes; the plant when left to itself seemed prostrated, but after a while (a quarter of an hour) the leaves opened and it seemed to recover itself. The second was acted on for ten minutes. This specimen was prostrated for an hour, after which it slowly recovered. The third specimen was galvanized for twenty-five minutes, but it never recovered, and in twenty-four hours it had the appearance of a plant struck by

lightning. A fourth plant was etherized, and then exposed to the current. Strange to say the latter had not any effect, the leaves remained straight and open; thus proving, says M. Blondeau, that the mode of contraction of the leaves of the sensitive plant is in some way allied to the muscular contraction of animals.

CALYCANTHACÆ. (*The Carolina Allspice Tribe.*)

Flowers aromatic and fragrant.

SWEET SHRUB. (*Calycanthus Floridus*, Linn.) Specimens from Aiken: I have observed it growing wild in Fairfield District, S. C. Fl. May.

One of the most aromatic and sweet scented of our indigenous plants; cultivated on this account in gardens. Dr. Jno. Douglass, of Chester District, S. C., sends me a communication rom his correspondent, Mr. McKeown, who says he has frequently used it with satisfaction, as an anti-spasmodic tonic, in the cure of chronic agues. A strong decoction of the seed or bark of the root is given. The wood is strongly camphorated, especially the root, and Mr. Nuttall thinks will probably produce this drug as abundantly as the *Laurus camphora*. The seeds seldom mature.

MYRTACEÆ. (*The Myrtle Tribe.*)

Eugenia, Micheli. Allspice family.

Several species of this genus are found in South Florida. See Chapman's Southern Flora. The oil from the berries should be examined, as they are closely related to the clove bearing trees, Caryophilus. The timber of most *Eugenias* is useful and good. Like the myrtles, their bark abounds in tannin, their soft parts contain a more volatile oil, and the fruit of some, though rendered somewhat disagreeable by the aroma of the oil, are edible. Wilson's Rural Cyc.

SAXIFRAGACEÆ. (*The Saxifrage Tribe.*)

De Cand. considers the whole order as more or less astringent.

HEUCHERA.

Heuchera Villosa, Mx. *Heuchera caulescéns*, Pursh. Mountains of North Carolina and Tennessee. The roots are ex-

tremely astringent, and were used as styptics and in apthous sore mouth. Rafinesque Med. Flor. Properties same as those of *H. Americana.*

ALUM-ROOT, (*Heuchera Americana*, L.) Grows in damp soils; Richland; collected in St. John's; Charleston District; found also in Georgia; Newbern.

Coxe's Am. Disp. 112; Lind. Nat. Syst. Bot. 163; U. S. Disp. 390; Barton's Collec.; Mich. Flora Boreal. Americana, i, 171. "A powerful astringent." The powder was employed by the aborigines in wounds and cancerous ulcers. Bart. M. Bot. ii, 159; Mér and de L. Dict. de M. Méd. iii, 490. It is also administered as a substitute for Colocynth. It is used in decoction, tincture or syrup, wherever an astringent is required—as in diarrhœa, piles, menorrhagia, etc., etc. These plants may serve the purposes of Rhatany, Kino and Catechu.

Hydrangea arborescens, L., *Hydrangea vulgaris*, Mx., *Hydrangea cordata*, Ph. Florida to Mississippi and northward.

Dr. S. W. Butler, of Burlington, New Jersey, introduced this plant into notice through the New Jersey Medical Report. He states that his father whilst on a mission to the Cherokees, learned of them the merits of this plant in the treatment of gravel and stone, and has himself employed it for many years in an extensive practice among a people peculiarly subject to those complaints. He considers it a most valuable medicine, possessed, perhaps, of specific properties. Dr. Parrish, in his Practical Pharm. in noticing the above, has modified Dr. B.'s formula for its preparation thus: Hydrangea, sixteen ounces; water, six pints or sufficient, boil the root in successive portions, mix them and evaporate to half a pint; mix this with two pints of honey and evaporate to two pints. In the summer season push the evaporation somewhat further and add a half a pint of brandy. The dose of this fluid extract is a teaspoonful twice or three times a day. Dr. P. says he has prepared it for several years and has dispensed it under the direction of several practitioners to numerous patients, and with general satisfactory results, in irritable conditions of the urethra, though its value as a specific remedy requires confirmation. Op. cit. 205.

In the 12th Ed. U. S. Disp. an analysis by Mr. Laidley, of Richmond, Va., is referred to, (Am. J. Pharm. xxiv, 20.) Drs.

Atlee, Horsley and Monkun, are also said to have confirmed the opinion of its utility "in sabulous or gravelly deposits." N. J. Med. Report, Septembor, 1854, October, 1854, and March, 1855. In overdose it occasions vertigo and oppression of the chest. U. S. Disp.

BURSERACEÆ. (*The Torchwood Tribe.*)

TORCHWOOD, (*Amyris Floridana*, Nutt.) South Florida. Chapman.

Nearly all the species afford fine materials in both their resin and their wood for fragrant incense and delightful pastiles. Wilson's Rural Cyc. Our species should be examined. A South American species yields a gum which makes one of the best of known varnishes. Frankincense is said to be got from the *Pinus tæda*. The *Bursera gummifera*, Jacq. of Florida, also yields a balsam called Chibou resin.

ANACARDIACEÆ. (*The Cashew Tribe.*)

Trees abounding in a resinous, sometimes acrid, highly poisonous juice, are the ordinary representatives of this order.

POISON OAK, (*Rhus toxicodendron*, T. & Gray; *Rhus radicans* of authors.) Diffused; common in pine lands; vicinity of Charleston; Newbern. Fl. July.

Trous. et. Pid. Mat. Méd. i, 524; Bell's Pract. Dict. 453; Eberle, Mat. Med. ii, 116; Pe. Mat. Med. ii, 603; Ed. and Vav. Mat. Méd. 345; U. S. Disp. 718; Ball. and Gar. Mat. Med. 241; Royle, Mat. Med. 341; Bergii, Mat. Med. i, 248; Mér. and de L. Dict. de M. Méd. vi, 78; Orfila, Toxicologie Gén. i, 45; Ann. de Chim. xxxv, 186; An. Journal de Méd. lxxx, 136; Eberle, Mat. Med. ii, 117; Ell. Bot. 363; Alibert, Eléms. de Thérap. i, 452; Big. Am. Med. Bot. iii, 20; Du Fresnoi, quoted in Ann. of Med. v, 182, and 483; Med. and Phys. Journal, i, 308; vii, 273; and x, 486; Duncan's Disp. 294; Buil. Plantes Vén. de France, 146.

It produces in those who come into its vicinity an erysipelatous inflammation. It is stimulant and narcotic, employed in paralysis and herpes; of the former disease, seventeen cases are reported by one physician to have been successfully treated with it. The juice which exudes on plucking the stem makes a good indelible ink. It is dissolved by ether. Bigelow thinks it is composed of a resin and an essential oil. Purging with neutral

salts, the use of opium, blood-letting and cold applications of acetate of lead are employed in case of poisoning from these plants. The bruised leaves of the *Collinsonia canadensis* (which grows in the Southern States) are also employed for the eruptions caused by the emanations from the poisonous sumachs, and the *Verbena urticifolia*, growing in the South, is likewise considered an antidote. Dr. A. Livezey, of Penn., as quoted by Dr. Wood, strongly recommends a saturated tincture of lobelia as a local application in this affection. He applies it by means of linen cloths, (Boston Med. and Surg. Journal iv, 262.) Dr. Proctor uses an alkaline solution applied immediately after exposure with excellent effect, and he finds that Monsel's solution, introduced by a pointed instrument into the vesicle, renders it abortive. (Am. J. Pharm. 1863, Nov.) U. S. Disp., 12th Ed. Horsefield, in his Diss., states that he administered the infusion in consumptive and anasarcous patients. Du Fresnoi reports cases of herpetic eruption cured by preparations of this plant; also four cases of palsy. Dr. Alderson, of Hull, has given it with good effect in doses of one-half to one grain, three times a day, in paralysis. Mér. and de L. Dict. de M. Méd. Supplém. 1846, 627. Dr. Baudelocque employs it with success in the chronic ophthalmia of scrofulous infants, a collyrium being made of the alcoholic tincture. Four drachms in two ounces of water is used, afterward augmenting the dose. Rev. Méd. Nov. 1836; A. Howroarth's Hist. R. Toxicod. in Essai Méd. du Docteur Alderson, Lond. 1793; Fontana, Traité de la vipère, ii, 169; Alibert, M. Méd. i, 450. Some have inoculated themselves with it without injury. Biblioth. Méd. xxvi, 395. "On cite un cas mortel par suite d'attouchement des parties sexuelles après avoir manié des rameaux de ce végétal:" Mér. *loc. cit.* See Annal. in Journal de Chim. In employing it for ring-worm Du Fresnoi increased the dose of the extract till it amounted to eight grains a day. "Novel effects concerning a dangerous American plant," by Gleditch, (in French;) see Journal de Physic, 1782; Du Fresnoi, in Actes de la Soc. de Méd. de Bruxelles, i, 136; Wursur, sur le R. Toxicod.; Actes de La Soc. Écon. de Florence, iii, 138; and observations by Wilhmet on the effects of this plant, in Journal de Méd. de Courv. i, 209; Employ. R. Tox. in Thesis, at Montpellier; Ann. de Clinique, vi, 343. Heinning's case of paralysis, cured by R. rad. in Bull. des Sc.

Méd. de Férus, iv, 262. It is employed in maladies arising from general debility, and defective innervation. A French writer testifies to the efficacy of this plant in homœopathic doses, in all cutaneous diseases. Dr. Alderson prefers the infusion of the recent leaves; Van Mons the extract of the dried leaves. By analysis, it contains a very combustible "hydrocarbonate," tannin, gallic acid, resin, gummy substance, fecula, etc. Griffith's Med. Bot. 185; and Stephenson and Churchill, iii, 167; Bull. des Sc. Méd. vi, 98; Bull de la Facult. v. 439. An acrimonious vapor, combined with carburetted hydrogen, exhales from a growing plant of the poison oak sumach during the night, can be collected in a jar, and is capable of inflaming and blistering the skin of persons of excitable constitution who plunge their arms into it. The yellow, milky juice turns dark, and forms one of the best indelible inks for marking linen, and is used by the Japanese as a varnish. Rural Cyc. See varnish sumach, (*R. vernix.*)

SMOOTH SUMACH, (*Rhus glabra*, Linn.) Grows in the upper districts; found near Columbia, and Augusta, Ga., in wet soils. N. C. Fl. May.

"If the bark of the root is boiled in equal parts of milk and water, forming, with flour, a cataplasm, it will cure burns without leaving a scar." The excrescences have been preferred, as an astringent, to tannin or gallic acid. Dr. Walters employed and substituted them for galls; their sourness is supposed to be owing to malic acid, which is contained in the pubescence. According to Dr. Cozzens, also, of New York, they are astringent and refrigerant, furnishing with water a cooling drink, useful in inflammation and ulceration of the throat. The excrescences on the leaves of the *R. glabra*, which I have gathered (1862) on Tiger Creek, Spartanburg District, are as large as persimmons—resemble fruit in appearance—are powerfully astringent, and contain moving bodies resembling seeds attached to the inner walls, surrounded by a white, cottony substance, probably embryo animals. These glandular excrescences are showy. I would recommend them as a perfect substitute for *tannin*. I have dried and powdered them. They are a pure astringent. From the experiments of Dr. Stenhouse, (U. S. Disp., 12th Ed.,) it appears that the tannic acid of sumach is identical with that of galls; malic acid and binoxalate of lime

coexist in the berries, (W. J. Watson,) and Prof. Rogers suggests the procuring of malic acid from this source. Dr. Fahnestock states that an infusion of the inner bark of the root is employed as a gargle, and is considered almost as a specific in the sore throat attending mercurial salivation. An infusion of the leaves sweetened with honey is serviceable, applied in the same way, and for cleansing the mouth in putrid fevers. The bark is considered a febrifuge. Lind. Nat. Syst. Bot. 166; U. S. Disp. 598; Am. Journal Med. Sci. 561; Mér. and de L. Dict. de M. Méd. vi, 77, where its employment as a gargle is alluded to; Rev. Médicale, i, 1830, 307; Griffith, Med. Bot. 106. The decoction of the root is used by the Indian doctors in the treatment of gonorrhœa and gleet, and as a wash in ulcers. In other words, it is an astringent. The bark of this, the *R. copal*, and the *R. typhinum*, and of the European species, acts as a mordant for red colors, and much use is made of it in the tanning of morocco leather. A vinegar may be prepared from the berries of this species.

I introduce the replies of several correspondents of the Charleston Courier (1862) to inquiries concerning the sumach.

Dr. Abner Lewis Hammond writes:

"The *Rhus Glabra* I consider identical with that so extensively grown for export and manufacturing purposes in Sicily. The difference, as seen in the size of the leaves, tree, etc., is attributable, no doubt, only to a difference in locality, soil and cultivation, and to no other. I have seen it flourishing alike on the mountain slopes and in the valleys of Virginia; on the rich table lands and bottoms of Kentucky, Tennessee and Illinois; on the flinty ridges and barren mineral lands of Missouri. Under cultivation it suckers freely. Looking at its value and importance as a manufacturing agent or material, and its easy production, I have long wondered at its total neglect, and feel no hesitancy in saying that with the same care given to its cultivation by our people as by the Sicilians, it could be as successfully and profitably raised in the one as the other country, and should, under existing circumstances, be neglected no longer. Hundreds and thousands of bags, at heavy expense, are annually imported into the United States for tanning and other purposes, yielding to the growers (after expense) a remunerating profit. The berries, the bark of the tree and roots,

have for years furnished the country people here and in the West a most substantial dyestuff, (a brilliant black,) while its prepared leaves (ground) have been as steadily used (to the full extent of the available quantity) in the preparation of morocco."

A correspondent from South Carolina says:

"Your article and a subsequent communication lead me to believe there is more importance in the sumach than I ever attached to it. I have gathered bushels of the berry on the mountains in this State for the purpose of having the wool dyed black for the woof of our home-made jeans. I will try its use in shoemakers' wax (as recommended.) There can be any quantity gathered in this section.

"Should any one wish to try dyeing wool, they will find it one of the handsomest black dyes known to me."

Dr. Wm. Jeuson, of Charleston, writes:

"Sumach—*Rhus Glabra*—figured also as *Rhus Virginicum*, better known as smooth sumach, and variously called Pennsylvania sumach, upland sumach, is a native of most parts of the continent of North America. Grows in dry, uncultivated places, flowering early in July, and succeeded by dense clusters of crimson berries, which, when mature, (about early autumn,) are covered with a whitish and very acid efflorescence (often used to make vinegar in country localities.) The bark and leaves are *astringent*, and said to be used in tanning leather and in dyeing. Excrescencies are produced under the leaves resembling galls in character. These have been used by Dr. Walters, of New York, who thought them in every respect preferable to imported galls. The only officinal part is the berries, which are used as a refrigerant and febrifuge, though Dr. Fahnestock speaks highly of an infusion made from the inner rind or bark of the root, for a wash and gargle in the sore mouth attending inordinate mercurial salivation. The writer's own experience has been to use the berries in impure water, or when that was not to be obtained, to put them into the mouth to allay the thirst attendant upon riding through the hot, unsheltered and frequently waterless prairies of the far West. He also knows that a syrup made with the berries is successfully used in the fall fluxes, while a drink made with them is a favorite remedy in many localities in febrile attacks. In the sickly year of 1853

the writer used them (the berries) constantly, although frequently changing his atmosphere from the free, open prairie to the confined pestilential air of a city with yellow fever ravaging it, and without experiencing the slightest indisposition."

James Peckham, of Columbia, South Carolina, adds:

"I have often wondered that no one here has engaged in its cultivation, or rather in gathering and preparing it for market, as it grows all over the country."

The following was communicated by Mr. C. H. Woodin, of Charleston:

"I notice in the Courier an inquiry in regard to the use of the sumach, which grows so abundantly in the lower portions of our State. Your correspondent informs us that it is very beneficial in making shoewax, consequently it was called *shoemach.* But the sumach is not only used for making wax, but it is extensively used in the New England and Northern States for tanning purposes.

"The sumach leaf is invaluable in tanning fine hog skins and skirting, and it is shipped in great quantities from South America to all the principal tanneries in the North.

"The process is this: It is well known to every tanner that the most important thing in making good leather is to have it properly colored, and that it is not crisped or parched on the grain in the 'handlers.'"

The shoemac leaf is put into a vat which is intended for a "handler," and then the vat is filled with clean, fresh water, and when it has stood until the strength is entirely out of the leaf, the skin or stock is taken from the "*bait*," rinsed in the "pool," and then placed in the "handler." The stock is then turned or handled as in other processes, until the grain is properly colored. It is then taken through the regular process of tanning, and when it is scoured it is perfectly white. The stock should be tanned with white oak, or some other kind of mild bark. "The advantage of the sumach is this: That the stock comes out fair and good, while in other processes the grain has to be made white by acids, which injures the stock very much. Tanners intending to make fair leather would do well to make a note of this information."

See "Sweet Gum" (*Liquidambar*) for my examination of this, the sumach and other *leaves*, as substitutes for oak bark.

Sumach berries in layers with wool and boiled will dye black *without copperas*. Vinegar and rusty iron will often fix colors without the aid of copperas. Sumac berries ground up are used for flavoring tobacco. The powdered leaves are sometimes mixed with tobacco to diminish the strength. The writer has often used them in this way. In Danville, Va., the peach leaf is often employed also to flavor tobacco.

POISON SUMACH; SWAMP SUMACH; POISON ELDER, (*Rhus vernix*, L., Ell. Sk., *Rhus venenata*, D. C.) Grows in the upper districts and in Georgia; collected in St. John's; vicinity of Charleston. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 82; Lindley, Phil. Trans. vi, Abridg. 507; Sherard, do. 508; Kalm's Travels, i, 77; Marshall's Abstract, 130; Cutler, Am. Acad. 427; Big. Am. Med. Bot. i, 86; Bart. Coll. 24; Thatcher's Disp. 321; see Big. *R. vernix*, Nouv. Journal de Méd. xv, 43; U. S. Disp. 718. This also gives out a poisonous exhalation; some are even affected by the atmosphere around it. It is thought to be identical with one in Japan, which furnishes a fine varnish much used in that country. Dr. Bigelow ascertained that the juice, which flows in large quantities from our tree when wounded in the spring, affords a brilliant, glossy, black varnish. Mér. and de L. Dict. de M. Méd. Supplém. 1846, 628. See Thunberg's Voyage, vi, 15, for a notice of the oil extracted from the seeds. Lind. Nat. Syst. 168; Linn. Veg. M. Med. 56. It is styptic and astringent and the resin is used as an ointment in piles. Bigelow, in his examination of the juice referred to above, believes that it consists of a resin and an essential oil. He first boiled it till the volatile oil had escaped; the remainder being reduced almost to the state of a resin, was applied warm as a varnish. Dr. Pierson reports an interesting case of poisoning from this plant; and it is said that some individuals have been injuriously affected by the fumes from the wood of this and the *Rhus radicans*, accidentally burnt on the fire. A swarm of bees was poisoned by alighting on one of these trees. New York Medical Repos.

WING-RIB MOUNTAIN SUMACH; COMMON SUMACH, (*Rhus copallina*, Linn. Walt.) Diffused. Vicinity of Charleston; Florida and Mississippi and northward; collected in St. John's; Newbern. Fl. July.

Ell. Bot. 302; Ed. and Vav. Mat. Méd. 136. A wash is applied to ring-worms. The root is used by the Chippeway Indians as an anti-venereal. The excrescences on the leaves are powdered and made into an ointment as an application to hemorrhoids. Griffith, Med. Bot. It does not afford copal. The leaves were mixed with tobacco and used by the Indians for smoking. The sumach is said to form an ingredient in the manufacture of "Killickinick" tobacco; since the war the leaves dried have been much used by soldiers in camp to render tobacco milder and increase its bulk. The berries are quite sour, and afford, with water, a cooling drink.

Wilson asserts in the Rural Cyc. that the *R. copallina* does contain *copal*. "The resin from this shrub exists in smooth brittle, translucent, roundish, small masses; has litttle taste and scarcely any odor; is fusible by heat, inflammable by ignition insoluble in water, very sparingly soluble in alcohol, and fully soluble in sulphuric ether and some essential oils. It is the characteristic ingredient of the well known copal varnish, an article requiring operose and careful manufacture, but distinguished for the brilliancy, durability, hardness and resistance of its exquisite polish." Consult "*Liquidambar*" for detail of experiments. By my experiments the *leaves* of the *Rhus* contain more tannin than either the sweet gum, myrtle, or any of the fifteen or twenty that I examined by reagents. I am also convinced that the excrescences abundant on the *Rhus glabra* (or smooth sumach) would furnish an excellent material for the supply of *tannin*. Upon drying and examining them, I find the tannin in a highly concentrated state. They would be suitably used wherever an astringent is required in medicine, and should be added with the leaves to the tan-vat. See article "*Quercus tinctoria*" in this volume, for trees furnishing tannin and gallic acid.

DWARF SUMACH, (*Rhus pumila*, Mich. Ph.) Upper districts; Newbern. Fl. August.

U. S. Disp. 719; Mx. Flora Americana. According to Pursh, it is the most poisonous of the species.

STAGHORN SUMACH, (*Rhus typhiana*, Walt. Flora Carol.) S. and North Carolina. Fl. July.

Mér. and de L. Dict. de M. Méd. iv, 82; see Analysis, in Journal de Chim. Méd. iv, 511. Lassaigne says that this con-

tains malic acid. The incised bark yields resin. It is employed in preparing morocco leather. See *R. vernix*, etc.

Rhus metopium, L. A tree fifteen to twenty feet high. South Fla. Chap.

This, which is also a West India species, furnishes a gum known as "Doctor's gum," which, in large doses is emeto-cathartic, and is said in smaller ones to be a useful remedy in disorders of the bowels and respiratory organs. A spoonful of the fresh juice is mixed with two ounces of boiling water; the dose is a teaspoonful given occasionally, (Jam. Phys. Jour.) Descourtilz, (Fl. Med. Antill., ii., 49,) states that the bark is an excellent astringent. Griffith.

The *Rhus aromatica* grows in West Florida and Mississippi and northward, is aromatic but not poisonous and should be examined. Our *R. cotinoides*, Nutt., which Buckley found in the interior of Alabama, may approximate in qualities to the *R. cotinus* of Europe "which furnishes most of the sumach of commerce," and the wood of which is the basis of a bright yellow dye.

Rhus coriaria. This species of sumach is exotic, and is the principal plant cultivated in Sicily for export. I insert the following, in case it shall be found expedient to "exploit" or plant for *tannin* our wild sumachs which are found so abundantly in rank meadows throughout the South; particularly abundant, I have observed, in the Dismal Swamp, Va. I think it is sufficiently abundant there to supply almost any amount for the purposes of the tanner or dyer.

"In the best sumach one hundred grains of the leaf should give thirty to thirty-five grains of pure tannin. The proper adaptation of the land can be ascertained by testing the leaves with sulphuric ether. 'Use as much sulphuric ether as will dissolve the sumach, or pass it through the sumach till it runs clear, then draw off the ether by heat, and the deposit will be pure tannin.' A rough test for tannin is prepared with a solution of sulphate of iron, or may depend upon its coagulation of albumen.

"The sumach is thus cultivated near Palermo: The soil is prepared as for potatoes, with furrows from two to two and a half feet apart, in which in January or February are placed the young suckers two and a half feet apart. In August of the

first year the leaves on the lower part of the branches are drawn off with the thumb and finger, leaving a tuft on the top. In October the whole head is taken off, or sometimes broken, and left hanging by the bark till dry. The second year, in June, the branches are stripped of ripe leaves; and in August, as soon as the whole plant is mature, it is cut with a sickle down to six inches. It is then spread out and dried thoroughly on each side till entirely cured. The June gathering is omitted in many cases when the plants are not strong. After being dried the branches are put upon a floor and threshed, when the leaves will separate from the wood, which is of no value except for fuel. The leaves are then ground between two millstones, one of which is on edge, and revolving around a centre. We visited a mill driven by steam-power, which threw out the powdered sumach in large quantities. The air was filled with fine particles of dust, which covered our clothing and entered the lungs. It is not injurious, however, for although it seemed suffocating, the workmen will sleep three or four hours successively in it; and are always remarkably healthy. They were particularly exempt from cholera. The leaves are readily reduced to powder while the stems are not. These last are then separated by sifting, and the pure sumach is placed in bags of one hundred and sixty-three pounds for shipment. Two thousand pounds of ground sumach to an acre is considered a good crop."

This corroborates my own suggestion regarding the employment of *leaves* for the supply of tannin. See article Tannin and Sweet Gum, (*Liguidambar*,) for my comparative experiments upon the leaves of gum, myrtle, etc., for tannin. Both these trees grow abundantly everywhere, and will easily supply a large amount of tannin, to be used as I suggest—in place of oak bark.

Most of the plants containing tannin will furnish a black dye, with iron. "The basis of *black dyes* for all organic fibres is the tannogallate of iron; but the modes of application vary with the nature of the fabric, whether silk, wool, or cotton. The finest blacks are obtained by a combination of colors; thus, a rich black is imparted to wool by grounding it with a deep, indigo blue, then passing it through logwood, galls, or sumach, and finally through a bath of these, with copperas and verdi-

gris, or immediately through the latter." Wilson's Rural Cyc. See, also, Ure's Dict. of Arts, article "Calico Dyeing." Any of our plants containing either tannin or coloring principles can be used as dyes, with alum or iron; vinegar also adds to the intensity of the color.

There is a paper by John M. Marston, on the cultivation of the sumach in Sicily, in Patent Office Reports, 1851, p. 60. I believe that the great abundance of sumach in Virginia, would supply for a long time all we would require—besides, it grows abundantly in our savannas, and among myrtles throughout the country. Mr. Marston thinks that the superiority of the Sicilian sumach lies in the mode of cultivating it—"all the leaves are the production of the *young sprouts* that spring up from the stump every year." The middle Southern States he thinks adapted to its growth. "The export of sumach to the United States last year was 65,000 bags."

I quote as follows from the letter:

"Sumach is an article of commerce to the Sicilians of great importance, as it is also with the Americans. And, it is my opinion that this article, so valuable for manufacturing purposes, for tanning, etc., can be produced in the United States in sufficient quantity to supply the world, if the mode of its culture be understood, and proper attention be paid to it.

"I have no idea that it is the same kind that grows in the United States, which there runs to the size of trees. In Sicily they plant the roots or small plants from two to three feet apart; rows about four, so that the plow or harrow can save the hand labor of the hoe. They hoe it two or three times before the rains finish in May, and gather it in July and August. The leaves are the only parts made use of. After being separated from the twigs by threshing, (or, in this country, both ways—by threshing and treading off with oxen and horses,) the leaves are then ground to the state of fineness in which you see it in the United States, being passed through sieves or bolting-cloths of sufficient fineness, and put into bags of one hundred and sixty pounds each. The proper season for planting the roots or plants is in November, December and January. When the season is rainy, the plants take root better. The root or stump is cut off from four to six inches above ground. The scions or sprouts spring up four to six out of each root;

and when at maturity, which in this island is in July or August, they are all cut off at the stumps, and laid in small handfuls to dry, say for a day or two. Do not spread them out much, as the sun will turn the leaves yellow, and great care must be taken that no rain falls on them. Perhaps, in this country, it may answer to plant nearer together than would be advisable in America, on account of the greater heat of the sun here, and thus shade the ground better. The leaves are ground in mills mostly by horse-power; but water or steam-power would be much cheaper and better. The perpendicular running stones weigh nearly three thousand pounds; they run double or single round an upright shaft. The nether or foundation stone is heavier, and one-third greater in diameter than the running stones. The grinding surface of these latter is slightly rough, being occasionally touched with the pick or cold-chisel. Hard granite stones answer; here they use a volcanic stone, which is as hard as marble. There follows round the running stones a little piece of wood that keeps the leaves always under the stones. When ground fine enough, it is sifted or bolted in a large, tight room, with a door to enter and fill the bags. In Sicily the article is more or less adulterated with spurious stuff, such as other kinds of leaves, and an article called *bucca*, which resembles the juniper bush of New England; this has no value in itself. I believe the first year they do not cut off the sprouts. In the second and following years, a curious freak of nature produces a single plant a foot or so distant from the original root; and this little plant it is which they usually make use of to transplant. Now, the plow or harrow would prevent these from growing, as they would be in the track, and this may be the reason why they hoe it. Still, I think the plow or harrow must be used in our country, and some way or other contrived to save these little plants if wanted."

The above was printed in the first edition of this volume.

It will be observed that I had called attention to the exploitation of the sumach, as above, in the first edition of this work, printed in 1863, and also to the great abundance of the plants. I hope that my suggestions have been productive of good. It is now become an extensive business throughout the State of Virginia, giving employment to many persons, and in time I hope that a large number of our population may derive profita-

ble employment from the same, and by cultivating or collecting medicinal plants, when depots for their purchase in small quantities shall be established in the large cities.

Dr. H. Baer, of Charleston, in a communication made to me requesting a series of popular articles upon these subjects, 1868, states: "I see that Virginia exports a large amount of sumach, and by some of my last circulars from Liverpool, I see it quoted at 8s. per cwt." The analysis was as follows:

Vegetable matter	83.10
Tannin	15.50
Sand	1.40

The following letter, which I find in the Norfolk Journal, will, no doubt, interest all dealers in sumach. It is from Alex. S. Macrae, merchant of Liverpool, and is dated Sept., 1868:

"I have to-day received a sample of Philadelphia brand American sumach—a very superior quality. Our first chemical analysis make it:

Tannin	20.80
Sand	0.75
Vegetable fibre	78.45
	100.00

"The best sumachs in this market average 16 a 20 per cent. of tannin, and sell at £13 a £24 per ton. I, therefore, make the value of the Philadelphia £16 per ton, at which price there should be a handsome remuneration.

"If, as you say, sumach leaves are to be had in Virginia for the gathering, what a trade has been neglected, which at once may be developed."

I see it stated that Fredericksburg has received one thousand tons this season; and a merchant of Fauquier County paid out last year $5,000 for sumach, a commodity which any person seems licensed to gather free of charge by merely requesting the privilege from landowners.

The Norfolk Virginian, (1868,) says of the "sumach trade:"

"This new item of interest to our industrial classes is now attracting much attention in this State, throughout the entire length and breadth of which it flourishes in profusion in a wild state. The material is used largely for the essential principle of tannin, which it contains, and factories for its extraction have

been established in this State and elsewhere. Our attention has been particularly called to the establishment of Messrs. Chisman and Crocker, in Hampton, who have gone into the business on a large scale, and from whose circular we make the following extracts, for the guidance of those who may wish to engage in its collection: 'Sumach must be of a good color, free from stems, dirt and berries.' * * * * 'It should be gathered from 1st July until frost, after which it will turn red, and then it will be worthless. It should be cured as much as possible under shelter, or in the shade, to preserve its color and strength—carefully threshed (and not cut) on a plank floor, or sheet, to keep it free from dirt and sand. The sticks, stems and berries should be carefully raked and picked out before sending to market."

They also give the following direction for gathering and curing the product:

"Gather as you would fodder of this year's growth, except the blossoms and berries; dry it under shelter; stir it as you would hay; be careful it does not heat; do not dry it in the sun—both will soil it; when dry put it in bulk. When dry, windy days set in, then lay it in beds as you would wheat or oats, thresh it with a flail, when the leaves and stems will break up fine; take out the large stems and throw them away; all the fine is called threshed sumach. Be careful not to have any sand on the floor before threshing. There is no weight in the large stems, being mostly pith and no strength; to bring them to market will only reduce the price of your sumach, and when you gather the large stems you have to wait that much longer for your sumach to cure. The strength of the sumach is in the leaf and leaf stem.

"With these instructions a large class of the population in the surrounding country can spend their leisure time in light but very remunerative employment, at no cost beyond the labor of gathering."

VITACEÆ, (*Vine Tribe.*)

Vitis bipinnata, T. and G. (*Ampelopsis*, Mx.) Margins of swamps, Florida and northward; abundant, bearing black berries in bunches.

Attracted by the sweetish taste and the purplish black hue

of the berries of this plant, which is closely related to the grape, I succeeded (1862) in extracting a beautiful *dark purple* by the following process: The berries were mashed in a mortar, vinegar was added, with a small quantity of powdered alum. The mixture was then boiled, and the yarn, or other material, previously wrung out of water, put in while hot. The color of articles dyed is said to be fixed more firmly by subsequently dipping them when thoroughly dried in boiling salt and water.

Vitis, Grape. Dr. Fair, of Columbia, S. C., informs me that the root of the winter grape (*V. cordifolia*) is powerfully diuretic. He had used it in several cases. See Pereira's Mat. Med. and Griffith's Med. Bot. for much information concerning the grape, wine, etc.

My friend, the late Major John Leconte, in a paper on the "American Grape Vines of the Atlantic States," expresses the opinion that a grape adapted to the production of wine in the Southern States would be ill adapted to the Northern States, which are colder, and less humid, and dry. "Thus, the Scuppernong grape can never perfectly ripen north of Virginia, and the fox grapes of the North will scarcely grow in the lower parts of Carolina and Georgia; the Isabella, or Catawba varieties of this last, which were originally brought from the upper regions of South Carolina, do not flourish in the low country, and will scarcely live in lower Georgia." To remedy the want of the sweet principle in a grape, nothing more is necessary than to boil down the must, before fermentation, until it is considerably reduced.

Major Leconte considers it quite possible to make wine that will keep without alcohol; also, that our American grapes do not require the pruning adopted in Europe. See, also, Patent Office Reports, 228, 1857, for a critical account of the species of grape growing in the Atlantic States, and Chapman's Flora of the Southern United States, under genus "Vitis," for grapes exclusively Southern. "Bland's Grape," *V. palmata*, so highly praised by Major Leconte, as being equal to any variety of the European grape, which he says grows in the mountains of North Carolina, is not included by Chapman as a native. It is the *V. Virginiana* of Poiret. Dr. A. P. Wylie, of Chester, S. C., has been for several years engaged very successfully in the cross-breeding of the different species of grape. The varieties

he has obtained by hybridizing possess as high flavor as the best foreign grapes, (1868.)

A writer recommends the use of natural *caves* as wine cellars. Drs. Gall and Petiol's "method of wine making, according to the modern principles adopted in Germany and France," is published in Patent Office Reports, 1859, p. 95. The same volume also describes the construction of cellars and vats, etc. Governor Hammond, of S. C., has had a large cellar built for wines, sugar cane juice, etc. These seem to me essential.

A correspondent says that foreign grapes must be laid in straw during the winter.

H. W. Ravenel, also of Aiken, S. C., who has been investigating the native grape with his known ability as a botanist, in a paper published in Patent Office Reports, 1857, and in his essay on the "Classification and nomenclature of Fruits," before the S. C. Agricult. Soc., gives an enumeration of our four American species of grapes so far studied, growing west of the Mississippi. Under these, viz: *V. labrusca*, L., fox grape, *V. æstivalis*, Mx., summer grape, *V. cordifolia*, Mx., winter or frost grape, *V. Vulpina*, L., bull grape, or *Bullace*, he classes the varieties which have proceeded from them, and to which all the others can be reduced; this also is the opinion of the best botanists of the day. Dr. Chapman has added another, the *V. caribaca*, of D. C.; confined to lower Fla. The *V. rupestris* of Scheele is found in Texas.

Mr. Ravenel makes a statement which is instructive: "All the species of *American* grapes are *diœcia polygamous;* that is, some of the vines bear staminate or barren flowers only, and are forever sterile; others bear perfect flowers, and are fruitful. All the species of the *Eastern hemisphere* are *hermaphrodite;* that is, every vine bears perfect flowers, containing stamens and pistils in the same corolla, and are fruitful. In the absence of other evidence, this fact would be conclusive of the parentage of an unknown seedling, whether it be of exotic or indigenous origin." The varieties of foreign grapes are referred to a single species, *V. vinifera*, L.

Professor C. T. Jackson, in a communication in Patent Office Reports, p. 42, 1859, remarks, in reference to the preservative power of sugar in making wine, as follows:

"We must find out the proportion of saccharine or alcohol-

producing matter in the American grapes, for if they will not produce alcohol in sufficient proportions to keep the wine from souring, we should have to add saccharine matter in some form to make a sound wine." In many portions of the country, it is found necessary to add sugar to wine. Jackson says that those grapes "which contain less than 15 per cent. of saccharine matter will require sugar or alcoholic spirit to be added to them, in order to make a wine that will keep." See, also, notice of Prof. Wm. Hume's paper, further on, and Patent Office Reports, 1859, p. 59, for proportions of acids and sugar in American grapes, cultivation, preparing wine, gathering grapes, apparatus, and making of wine in detail, p. 55, *et seq.*

See a paper with full description and mode of cultivation of wine, with manufacture of wine near Cincinnati, in Patent Office Reports, 1848, pp. 6–14. The value and amount of yield per acre is also given in this paper. I will extract a portion of it:

Selecting and preparing the ground.—A hill-side with a southern aspect is preferred. If the declivity is gentle, it can be drained by sodded, concave avenues; but if too steep for that, it must be benched or terraced, which is more expensive. In the autumn or winter, dig or trench the ground with the spade all over two feet deep, turning the surface under. The ground will be mellowed by the frosts of winter.

Planting.—Lay off the ground in rows three by six feet; put down a stick, twelve or fifteen inches long, where each vine is to grow. The avenues should be ten feet wide, dividing the vineyard into squares of one hundred and twenty feet. Plant at each stick two cuttings, separated six or eight inches at the bottom of the hole, but joined at the top. Throw a spadeful of rich, vegetable mould into each hole, and let the top eye of the cutting be even with the surface of the ground, and if the matter is dry, cover with half an inch of light earth. The cuttings should be prepared for planting by burying them in the earth immediately after pruned from the vines in the spring. By the latter end of March, or early in April, which is the right time for planting, the buds will be swelled so as to make them strike root with great certainty. Cut off close to the joint at the lower bud, and about an inch in all above the upper.

Pruning.—The first year after planting cut the vine down to a single eye, (some leave two,) the second leave two or three,

and the third three or four. After the first year, a stake, six and a half or seven feet long, must be driven firmly down by each plant, to which the vines must be kept neatly tied with willow or straw as they grow. Late in February, or early in March, is the right time for spring pruning in this climate. Summer pruning consists in breaking off the lateral sprouts and shoots so as to leave two strong and thrifty canes or vines—one of which is to bear fruit the ensuing season, the other to be cut down in spring pruning to a spur to produce new shoots. These may be let run to the top of the stakes, and trained from one to the other, until the wood is matured, say in August or September, when the green ends may be broken off. One of these vines is selected next spring for bearing fruit, and cut down from four to six joints, and bent over and fastened to the stake in the form of a bow. The other is cut away, as well as the fruit-bearing wood of the last year, leaving spurs to throw out new wood for the next, and thus keeping the vine down to within one and a half to two feet of the ground. Nip off the ends of the fruit-bearing branches two or three joints beyond the branches of grapes, but do not take off any leaves. If both the cuttings grow, take one up, or cut it off under ground, as but one vine should be left to each stake.

Culture.—The vineyard must be kept perfectly clean from weeds and grass, and hoed under two or three times during the season. Keep the grass in the avenues around down close. About every third year put in manure by a trench the width of a spade, and three or four inches deep, just above and near each row; fill in with two or three inches of manure, and cover it up with earth.

Wine making.—Gather the grapes when very ripe; pick off the unsound and unripe berries. The bunches are then washed in a washing tub, or passed through a small mill, breaking the skin, but not the seed, and thrown into the press, and the screw applied until the skins and seeds are pressed dry.

Fermentation.—This process is very simple. The juice is put into clean casks in a cool cellar, and the casks filled within about four or five inches of the bung, and the bung put on loosely. The gas escapes, but the wine does not run over. In two to four weeks, generally, the fermentation ceases and the wine clears; then fill up the casks and tighten the bungs. In

February or March rack off into clean casks. In the spring a moderate fermentation will again take place; after that the wine fines itself and is ready for bottling or barrelling. Use no brandy or sugar if the grapes are sound and well ripened. Keep bunged or corked tight, and in a cool cellar, and the wine will improve by age for many years. A paper on "North Carolina Grapes," p. 48, may be consulted in Patent Office Report on Agriculture, 1851. It gives an account of wine made from the wild fox grape, and others, and discusses some of the native varieties. Johnston's Chemistry of Common Life, vol. 2, Chaptal's Chemistry, in its relations with Agriculture, chapter on "Fermentation," Ure's Dictionary of Arts, article, Wine, "Fermentation," etc., may be consulted for information as to the processes of wine making. See DeBow's Review and DeBow's "Industrial Resources of the South and West," in three volumes, for articles on cultivation of grape and wine making at the South; also, Patent Office Reports, 1859, p. 72, for a very full and detailed account of cultivation of grape, manufacture of wine, construction of vats and cellars, by Dr. Weber, of Washington. I regret that I cannot condense this article.

In Missouri and Ohio it is found that the *Catawba* grape, a native of the Atlantic seacoast, is liable to rot, and to be affected by mildew. A writer in Patent Office Reports, 1854, p. 453, recommends several hardier varieties, viz: The *Halifax*, (wine mild and spicy,) *Norton's Virginia seedling*, (wine fiery and aromatic,) the *Rockhouse Indian*, which is said to produce a wine not inferior to the best Burgundy. The writer gives some directions about the culture, and adds: "In the place of putting the 'bung loosely' on your casks during fermentation, put on the bung-hole first a grape leaf, and upon that a small bag filled with fine and not quite dry sand. In good cellars and large casks your wine will, and must not clear in less than six or eight weeks. Rack off in March, then again in midsummer, and again just before the time of the next harvest. Before every racking, have your cask well sulphurated. Then your juice is real wine and may be bottled; it will keep as long as you please and improve considerably for a series of years." I introduce the above, as it seems to contain some practical directions.

The "rot" in grapes is caused by an excess of moisture about

the roots, and moist and damp weather. Vineyards located upon "stiff, cold, clayey sub-soils, which unavoidably retain the excess of moisture and produce injurious effects, can be obviated by thorough draining, or by selecting soil which is warmer, lighter and richer in the ingredient most favorable to the vine."

The "mildew" is often a most serious cause of disease in grapes, extending over entire sections of country, as almost to discourage the cultivation. It is considered to be a parasitic fungus. See a paper on this subject in Patent Office Reports, 1854, p. 311, by J. F. Allen, of Massachusetts. In the New England States the presence or absence of this fungus depends upon the condition of the weather, and the progress in maturity of the vine in August and July. There the fungus appears during foggy weather, resembling a white mould. In Reports for 1853, p. 311, an engraved illustration is given of this mildew fungus. "When a grape becomes affected by it, the fruit will either dry or crack open, unless checked or destroyed before it makes much progress. The so-called disease is a living plant, most rapid in its growth and wonderful in its powers of reproduction and multiplication. When a vine has once been infected by it, the seeds or sporules in countless millions lie waiting a favorable atmospheric change to spring into life; and when this does occur, so rapid is their growth that in one day the under side of the leaf will be almost covered." The plan of dusting the leaves with sulphur is impracticable. The writer says he has found a wash quite effectual in destroying this fungus, and it can be applied on a large scale with the garden engine; on a smaller, by the syringe or the nose of a watering-pot.

"To prepare this wash, take one peck of lime, not slacked, and one pound of sulphur; put them together in a barrel, and pour hot water over them sufficient to slake the lime; pour on this three gallons of soft water, and stir the mixture well together. In twenty-four hours it will have settled and become perfectly clear. This should be drawn off as clear as possible. Half a pint of this mixture added to three gallons of water will be sufficiently strong, and may be applied over the fruit when mildew first appears. It can be repeated every few days, if occasion requires. The first application I have found would kill the most of it; a second and third are all that I have ever found necessary for the season. The fruit and foliage have

ripened fully on the European varieties. The American or native varieties are less subject to the attacks of this fungus than the European. There is also a difference in these, the Catawba and Isabella being more attacked than some other kinds. That this mildew or fungus requires a peculiar condition of the atmosphere to allow of its vegetating is a hopeful fact for the people of the European grape growing regions. A series of seasons unpropitious to its growth, may destroy millions of sporules or seed vessels deposited upon their vineyards."

I have seen grapes attacked with a disease, an apparent blackening or rot of the internal portion of the fruit, which had never been attacked until the arbor was covered over, and thus the requisite amount of light was diminished. In this case, they become diseased from too much shade and moisture, and the remedy is plain; but in some cases this occurs under a full supply of light. The U. S. Commission to the Paris Exposition, in their report published in P. O. Rep. for 1867, state that the application of sulphur to the leaves is the best remedy for diseases affecting the vine.

Wilson in his Rural Cyc. furnishes from several sources recipes in his article on "Wine," for making "Wine from the *leaves, tender shoots, and tendrils of the vine;* if judiciously prepared, it is so excellent that Mr. MacCulloch compared it to 'white hermitage.'" See, also, MacCulloch's Treatise on Wine Making Excellent wine is also prepared from the unripe berries, *loc. cit.*, where the method is given. It is as follows: The claret vine leaves, as he observes, will produce a red color, and this tree could be cultivated for the express purpose. Having repeatedly prepared red and white leaf wine, we can with the greatest confidence offer a few abbreviated extracts from Mr. MacCulloch's book, previously observing that the specific gravity of the liquor must here also be taken as the criterion of strength; the proportions are calculated for ten gallons of wine. The leaves should not have attained their full growth, and must be plucked with their stems. On forty or fifty pounds of such leaves, seven or eight gallons of boiling water are poured, in which they are to infuse for twenty-four hours; the liquor being then strained off, the leaves are to be forcibly pressed. A gallon more water is to be added, and the leaves again are to be pressed. A screw wine-press with hair bags, is very useful in the process. Sugar,

varying from twenty-five pounds to thirty pounds, is then to be added to the mixed liquors; the quantity is to be made up to ten gallons and a half. Such are the essentials of Mr. MacCulloch's directions. We need only add, continues the editor, that if a fermenting, lively wine be contemplated, the manufacture must be conducted as in the process for Champagne, and the smaller of the two proportions of the leaves, etc., is to be employed. The specific gravity of the must should be 1.110 to 1.115. The fermentation must be carried on for a short time in the open vessel, or till the gravity be reduced to 1.090; and the barrel will require to be filled, and be kept full, in order to carry off the froth and leaven that rise to the top of the liquor. But we apprehend that grape leaves are better qualified to produce a dry wine, and, therefore, the larger proportion of leaves, etc., should be employed, and sugar to the extent that will raise the gravity to 1.120. In this case, the fermentation must be conducted in the manner already stated for the production of a dry wine from green grapes; and when perfected, and the wine becomes bright, it is to be fined and racked off during clear and cold weather, then returned to a clean and sweet cask, and bunged close. A second fining and racking may be required. Grape wine made from the grëen berries, we have found delicious in flavor, and quite fit for the table in two years or less. But the liquor obtained from the leaves contains a quantity of vegetable extract which conveys a flavor that time alone can subdue; hence, we recommend, the author adds, that it be always retained two years in the cask, and be bottled in the second winter. It ought also to remain during one entire year in the bottles. Wilson's Rural Cyc. art. "Wine."

The following brief statement of the mode of making wine, by J. S. Reid, of Fayette County, Ind., appears so simple, that I quote it here. (See P. O. Rep. 1855, p. 308:)

"The mode adopted by me of making wine is as follows: From the 1st to the 15th of October, I continue pulling the grapes, always selecting the ripest ones first, and after mashing them in a tub made for the purpose, subject them to a small press made in the form of a cider-press. The barrels into which the juice is put are well washed with cold water, dried and fumigated with sulphur before the must is put into them. I then place over the bung-hole a piece of tin or sheet-iron per-

forated with small holes. The must is then allowed to ferment slowly for about three weeks, until the scum caused by the fermentation apparently ceases. The barrels are then filled and bunged tight until spring, when I rack the wine off into clear casks, washed out with cold water and juniper berries, and fumigated with sulphur as before, to destroy any bad flavor. It is then ready for market; but during this time the casks require to be frequently examined, and filled up, keeping them always full to the bung." The reader can find in the Patent Office Reports of 1855, p. 304, a brief statement by D. Ponce, of Hancock County, Ga., of the method of making Champagne wine in France.

Dr. Wm. Hume, Professor in the State Military Academy of South Carolina, read a paper before the South Carolina Medical Association, on the "Manufacture of Wines in the South," and delivered a series of Lectures before the Aiken Vine Growing and Hort. Society, which have been revised and published in DeBow's Review, March and April, 1862. In these well written articles he gives the results of experiments, containing an exposition of a plan to obviate the disabilities of climate opposed to the manufacture of wine in South Carolina, etc.

In brief, Prof. Hume advises that the two qualities of sweetness and acidity in wines (which vary in different varieties and at different seasons) should be ascertained and considered by the wine maker. The latest date compatible with the full and perfect maturation of the grape should be selected for gathering, so that they should be as little acid and contain as much sugar as possible.

Cellars should be constructed in order to prevent acidity during the fermentation, and if necessary alcohol, brandy, or whiskey should be added, to preserve the preparation from turning sour, and also to procure different varieties of wine. I would refer the reader to the articles for an agreeable and forcible exposition of the author's views. He rejects the idea that it is useless or improper to modify the juice of the grape by alcohol under its various forms. Many wines are to a certain extent factitious, but not adulterated. The writer says: "I have clearly shown that the purely manufactured wines of Aiken are either too acid or too weak in spirit—that these defects proceed from immaturity of the grape and from the

high temperature of the must during fermentation. The high temperature induces two evils which are injurious to wine, viz: the loss of alcohol by its conversion into acetic acid, and its loss by more rapid evaporation during the exposure of fermentation." Cool cellars are certainly one obvious desideratum. The addition of alcohol to wine as a preservative agent has been referred to by writers: "The object and intention of adding alcohol to recent grape juice is to preserve it through the months of August, September and October unchanged by fermentation. During the month of November the cool weather is sufficiently established and continues in Aiken to conduct the vinous fermentation without the apprehension of the acetic; hence wine, not vinegar, can then be made." (Hume.)

The reader can find a good account of fermentation and the rationale of manufacture of various liquors in Solly's Rural Chemistry, p. 164, *et seq.* Drs. Gall and Petiol also refer to the process of "ameliorating" the wine made from the wild grapes by the free addition of sugar dissolved in water, adding also tartaric acid if the acid is deficient. The husks or pomace which remains is again treated with sugar, water or acid as long as any wine extract remains, and so an enormous amount of wine is made at small cost. In this process the grapes are mashed, not pressed. See details, P. O. Rep., 1859, p. 97. Tables for calculating the acid and sugar are described. I regret not being able to give this method in full.

In connection with Prof. Hume's project of adding alcohol to wine, I extract the following from an article on the "Grape and Wine Culture in California," P. O. Rep., 1858, p. 342. "Angelica is a sweet wine, which is never allowed to ferment. It is made by adding brandy to white wine, which is the first and purest juice that runs from the press, in the ratio of one to three, as it comes from the press. *It is thus kept from fermentation, and always remains sweet.* It is immediately put into close casks and drawn off as soon as it is clear, which is generally within four or five weeks. The casks for Angelica wine have to be prepared with great care by sulphuring. "Aguadiente" (brandy) only can be used in making Angelica, as it has the true grape flavor, which most other brandies have not. This brandy is distilled from wine made from leaves or from the pomace (skins of the grapes) of the pressed grapes. It takes about five gallons of

wine to make one of aguadiente." By this it will also be seen that the shape in which the alcohol is added is material. Let us compare the following with our difficulties here in South Carolina and Georgia. Italics are my own. Matthew Keller, of Los Angelos, Cal., says: "The manufacture of wine, in a suitable climate, is simple and may be done by any one of ordinary intelligence. *But when the climate and soil are not adapted to the nature of the grape*, then, indeed, it becomes a complicated art. One of the most essential things to be observed in its manufacture is the proper regulation of temperature, particularly during the phenomenon of the first fermentation; and to this the least attention is paid. If the must is too cool, the fermentation is slow, and apt to sour; while if there is too much heat, it will soon go into the acetous state. Much which abounds in saccharine matter, and is deficient in ferment, requires a higher degree of temperature than that which has these substances in opposite proportions. The strongest must, even when it contains much ferment, can support a higher temperature than the weak, because the great quantity of alcohol which is developed retards the action of the ferment and prevents the tendency to pass to the acetous fermentation. The best general temperature is between 62° and 64° Fahrenheit. There is little difficulty in maintaining the temperature in a cellar, but it may be observed that the act of fermentation elevates the temperature. To arrive at that which is the most convenient, it is necessary to pay attention to the temperature of the grapes at the time of mashing them: if picked early in the morning or at noon, it varies many degrees. To obviate this, they may be picked a day in advance, or they should be cooled in a large vat, and *vice versa*. These few facts comprehend all that is necessary to make wine, but they are subject to many variations and much detail, like most other processes of manufacture." The necessity for the display of judgment, and the value of experience in modifying processes, is true of the manufacture of indigo, of sugar from the different variety of canes, etc. No rigid rules adapted to every climate can be depended upon. That vats should be essential, I myself, without experience, felt sure from seeing their necessity in keeping porter and ale in Charleston, or cider in the upper country. We do not manufacture any of them in Charleston, but in order to bottle or keep them under favorable circumstances, a cool cellar is essential.

The writer quoted above gives the method of making wine in Los Angelos, as follows: "The grapes are deprived of their stems by hand; they are then mashed between wooden or iron rollers; some tread them out in the ancient style. A portion of the juice runs into a cooling-vat, without pressing; the crushed grapes are put into a screw-press and forced out rapidly, all the result being must for white wine. As the grapes are black, and the coloring matter exists only in the skin, and requires in some degree the presence of alcohol to dissolve it, if the pressing be done quickly the wine will be white; but if slowly, or if the grapes come broken from the vineyard, the must will show color; for as soon as the fruit is broken, and the juice comes in contact with the air, fermentation commences, and simultaneous with it, the presence of alcohol, in a greater or less degree, which extracts the coloring matter. The must is then transferred into the fermenting tuns, and the first active fermentation goes on, according to circumstances, for from four to ten days. The mashed grapes are put into vats to ferment, from which results red wine. This is in part distilled into brandy. Some persons distil red wine with the "marc" into brandy immediately after fermentation, but if left to pass a secondary fermentation it would yield more alcohol. The wine is racked off in January and February, again in March and April, and for the third time in September. It should be taken off the lees after the first fermentation subsides, when the wine has settled; for it cannot gain anything by being allowed to stand on the lees longer than is absolutely necessary. *The proportions of saccharine matter and ferment in our grapes are well balanced*, therefore there is no extraordinary art in making wine; as it will make itself with common care, and without the addition of any extraneous substance. The purest and finest wines in the world are made from the juice of the grape alone (?) More capital is needed to make proper cellars, procure necessary materials, and to enable us to hold our wines till they have age, when they would compare favorably with the best. See, also, P. O. Rep., 1859, p. 94, *et seq.;* also an extended account of grape culture and wine manufacture, with wood-cuts of presses, etc., in Report 1856, p. 408, by J. A. Warder, M. D., of Ohio. The diseases affecting the grape are also described.

I obtain the following from the Southern Field and Fireside: Although this subject has been widely discussed, and hun-

dreds of methods recommended, still I see no satisfactory article written which has treated this question as to our Southern grapes and climate. Almost all the writers have confined themselves to the Northern and Western wines and their modes of production, leaving out the idea that Georgia, Alabama and South Carolina had more resources for wine producing than all the North and West combined, not speaking of the immensely superior quality of its products. I trust that the following hints may be of service to some beginners, and be auxiliary to many masters in the art.

There exist a large number of varieties of wine, differing among themselves by the color, perfume, taste, consistence, etc., and often many such varieties are produced by the same grape. Often those varieties of wine depend upon many circumstances—such as difference in soil and sub-soil, exposure, mode of cultivation, climatic influence, degree of maturity of the fruit when pressed, and above all, by the mode of making the wine. The first process is the gathering of the grapes, and this should be one of the most careful. The grapes should be thoroughly ripe, and the best signs of maturity are these: The stem of the clusters changes to brown, the berries become soft, and when the bloom is removed the skin is smooth and nearly transparent, the flavor is vinous sweet, and the seeds free from the pulp and dry. At this point the grapes should be gathered. If gathered sooner the wine will be of an inferior quality, and apt to form vinegar; if later, the wine will be less in quantity and syrup-like. When the grapes have attained the right period of maturity, select a dry, clear day, and do not begin the gathering until the dew is well evaporated, and the grapes perfectly dry. Use sharp knives or scissors, and remove all green and decayed berries from the branches, and put them in clean wooden pails; then, if the press is some distance from the vineyard, put them in wooden tubs, which must not be too large, so as not to be difficult to handle, and transport by wagon. Now it is necessary to give some remark upon the process to be followed according to the mode of wine to be produced, and to the variety of grape employed. Our native grapes of the *Labrusca* or fox type are mostly cultivated in this section of the country, and the wine they produce is of the Hock or Rhine wine order. The great value of that wine consists in its delicate aroma, *or bouquet*, and

to attain it must be an essential object in its making To this class belong the Catawba, Isabella, Diana, Delaware, etc., etc., the former of which being most generally cultivated. I will describe the process in its best manufacture.

When the grapes are gathered they must be mashed between wooden rollers. The juice is received in a clean cask or vat, but the hulls, seeds or stems are carefully avoided to come into contact with the juice. After the whole is mashed it is pressed. The juice which runs out at the time of mashing should be kept separate from the juice which comes from the pressing, as the former will make a wine much more delicate than the latter. The pressed juice will be of a marked color. The casks or vats should be of as large size as consistent with the quantity of the crops. They should be made of the best white oak, with strong iron hoops. The greatest cleanliness is necessary. Wash the casks well, and further fumigate them by burning a wick of sulphur, and keeping the bung closed. Avoid sulphuring too much, as it will give a bad flavor to the wine if done to excess. Fill the cask full, then close it with a tight bung, in the centre of which is fitted a siphon, the lower end of which rests in a vessel filled with water. The juice of the Catawba, as well as that of all the grapes of that class, should never be fermented upon the hulls, as it then loses its delicate flavor, and only produces a harsh wine—neither a hock nor a claret. The above method is also applicable to the juice of any grapes of which a white or pale wine is desired. Juice thus treated should be left in the cask until the following spring, after the blossoming of the vine, at which period it will undergo a slight fermentation. It can then be drawn off in clean casks of required size for market, or in bottles; but it will be to its advantage to leave the wine in casks for two or three years before bottling.

The process of making red wine is different—the grapes being mashed, with hulls, seeds, etc., in a fermenting-vat, (a cask having one head taken out will answer for a small vintage.) A faucet is put at about eight or twelve inches from the bottom; usually a bunch of cuttings is placed in the interior to keep it free from the seeds, etc., in drawing off, leaving a space five or six inches between the must and the lid, which is well fastened, and has also a valve for the evaporation of the gas. This may be also arranged with a siphon, as in the manipulation of the

white wine, the end of which siphon must rest in water. In a few hours after the must has been put in the vat the liquid will commence to ferment, the gas will be thrown off in large quantities, and bring upon the surface the stems, hulls and seeds, which form what the French term *chapeau*, (hat.) This mass is often very consistent. As soon as the *chapeau* shows signs of going to pieces is the time to draw off the wine from the vat. The residuum is then pressed, and generally makes a wine containing much tannin, and not as delicate as the wine first drawn. The latter wine is kept separate, or mixed with the other wine, as desired. As soon as the wine is drawn in clean casks put the bung in lightly for a few days, then bung it tight. A still easier method is to put a false bottom in the fermenting-vat, which is made from well seasoned wood, and holes bored all over. This false bottom is put upon the hulls to prevent their rising. Its position must be regulated by the amount of pomace in the vat, and kept steady by sticks. The vat is covered as before with a tight head and siphon, and the period of the drawing off the wine is visible when the fermentation ceases. In general, the fermentation will last from eight to twelve days. This method is applicable to all the colored grapes of the *æstivalis*, or summer grape type—such as Lenoir, Clinton, Jacques, etc. The cellar should be dry, and of an even temperature of about fifty to sixty degrees. After the young red wine is put into the cellar it will undergo a light fermentation. The casks have to be filled occasionally, and kept full to the bung. As soon as dissolution of the sugar and the other constituents of the wine has taken place, the undissolved matter will settle at the bottom, and is called lees. When the wine becomes quiet and settled, it is time to draw it off in clean casks. In the above remarks I have endeavored to compress the wine making to a small compass, by which it will be seen that it is far less complicated than presumed. I give the different wines obtained from our native grapes.

Varieties belonging to the *Vitis labrusca*, or fox grape:

Catawba.—A light colored hock, often equal to the celebrated Rhine wines.

Diana.—Also a light colored wine, much more delicate than Catawba.

Delaware.—From small experiments yields a wine of the muscatel class, remarkably rich, and very often makes a beautiful, sparkling wine.

Isabella.—Makes a wine of a pale red color, if fermented upon the juice, and a darker wine of a claret order if fermented upon the hulls.

Hartford prolific and Concord.—A dark, harsh wine. These varieties are not well calculated for wine.

Varieties belonging to *Vitis æstivalis*, or summer grape:

Clinton.—Makes a high-bodied wine of the claret order. This variety is destined to be relied upon as our red wine grape at no distant period.

Jacques.—Gives a very dark wine of the Burgundy order. Its juice can be manipulated as for white wines—there being a large amount of coloring matter in the juice.

Lenoir with Clinton.—Will give a delicate claret or port.

Warren.—Makes a wine of the Madeira class.

Pauline.—Somewhat similar to above.

Taylor or Ballet.—A white variety of the Clinton, and doubtless will soon be our standing, or white wine variety.

The Scuppernong.—A variety of *Vitis cordifolia.* Yields a wine of the muscat order, but unfortunately sugar and alcohol are too generally added, and thereby a good wine is spoiled.

Many other varieties of our native grapes will soon be experimented upon as to the wine making qualities; but with the above list we can obtain almost all the classes and colors of wine that are imported in this country.

The Commissioners to the Paris Exposition recommend (P. O. Report, 1867,) the introduction into this country of a coarse but very productive grape called in France "En Regat." It yields a very cheap wine.

In Spartanburg District, S. C., they make out of the garden grape a very pleasant wine, which is the pure juice of the grape, by the following simple process:

Squeeze the grapes through a bag; to each gallon of juice put one pound of sugar, (more may be added;) set it away in jars or casks for two or three days, occasionally skimming off all the supernatant froth, scum, etc. Then strain into a cask, adding some honey and brandy. A gallon of brandy may be

added to twelve gallons of juice. This wine is said to equal the best quality. Very good wine is also made by adding sugar and brandy to apple cider.

A correspondent of the Southern Field and Fireside writes as follows:

"*Cultivation of Grapes.*—Growing Scuppernong grapes in the South is easy, pleasant and very valuable. My plan is this: In February take the vines that you have rooted the previous year, and set them in some place where you want them, say in rows ten feet each way, with some convenient place for them to spread their branches on, and soon erect a good arbor to each one, and if they are well treated they will soon cover the whole field. The best land for this vine is light, sandy soil, and the best manure is grass or weeds, hoed up when green and put under the arbor; also, rotten wood, such as old boards, rails, sticks, etc., piled under the vines. It is also good to have a pen around the roots filled with all the scrap leather, old shoes, bones, brickbats, etc. When the vines begin to grow they must be pruned every spring, for the tendrils will rap around the branches, and when the branches grow large, die or break off, it will injure the vine very much; but when they get old a large vineyard would require a great deal of labor, so this part generally receives but little attention when the vineyard is old. This grape is not only useful to preserve and pleasant to eat, but the most delicious wine can be made from them. When they are fully ripe gather them, and they can be ground in a gridder, or if that is not convenient, mash them in a trough; then press them well, putting three-quarters of a pound or a pound of sugar to the gallon; in this every one is to be governed by his own taste. When well sweetened, put it in casks and draw it off from one to another, until it is purified; then bung it very tightly to prevent evaporation, and set it in a barn or cellar six or twelve months; it is then good enough for anybody to drink."

Wine Farming and Making.—Mr. R. Buchanan, of Ohio, who is one of the most eminent vine-growers of this country, thinks that "wine farming will, in a few years, become simplified, and almost as easily understood as corn farming. There is no mystery in it. Experience alone must teach the proper position and soil; the right distances apart for the vines; the most ju-

dicious methods of spring and summer pruning; and as for cultivation, keep the ground clean with the plow or cultivator, like corn. Certain rules are given in books for vineyard culture, as pursued in the Ohio valley. These are the European systems, adapted to our own country. 'It will be safe to follow these rules, until by experimenting we can find better. There is more room for progress in this branch of agriculture than in almost any other.

"Making the wine is as simple as making cider. The great bunches are cut from the vines, and all unsound or unripe berries picked off the bunch and thrown into a bucket, to make—with the addition of sugar—vinegar, or an inferior wine. The perfect grapes of each day's cutting are taken to the wine-house, and in the evening, after being mashed in a barrel with a beetle—stem and berries—or passed through wooden rollers in a small mill, are put on the press and the juice extracted. About one-third runs off without any pressure. The outer edges of the pomace are cut off for eight or ten inches after the first pressing, separated with the hands, and thrown on top, when the power of the screw is applied, and another pressing made. This is repeated two or three times. The juice from the last pressing being very dark and astringent, is put with the inferior wine. The other is put in large casks filled about five-sixths full, to ferment and make the good wine. No sugar or brandy should be added to the best Catawba juice, or must, as it makes a better wine without, and is strong enough to keep well. One end of the siphon is placed in the bung-hole of the cask; the other being crooked over, rests in a bucket of water.

"The fermentation commences in a day or two, and the carbonic acid escapes through the water. In ten or fourteen days, the siphon may be removed, the casks filled up, and the bung driven in lightly; in a month tightly. In midsummer the wine is drawn off into another cask, and the lees of the wine, with the pomace of the grapes, are used to make brandy.

"The wine will be clear and pleasant to drink in a month or two after the first fermentation ceases. The second fermentation occurs in the spring, about the time of the blossoming of the grapes; this is but slight, and it will be merely necessary to loosen the bungs; when it is over, the wine will be clear in two or three months, and safe to bottle, but that operation had

better be deferred until November. And this is the whole process of making still wine—the wine for general use; and, being a natural product of the pure juice of the grape, it is more wholesome than any mixed or artificial wine, however showy and high-priced it may be.

"Let the grapes be well ripened; the press, casks, and all vessels perfectly clean, and then keep the air from the new wine, by having the casks constantly bung-full, and there is no danger of its spoiling. This is the whole secret.

"It is presumed that no one will go into wine farming largely at first; but take the precaution to test, by the cultivation of a few acres, the capabilities of the soil, position and climate, and the kind of grapes best suited to it."

I am induced to give place to the following article by Mr. P. J. Berkmans, of Augusta, Ga. As it treats of the Cultivation of the Grape at the South, and is written by a man of practical experience, (from the Trans. of the Richmond Co., Ga., Agricult. Club, 1867.) I will condense some of the information contained in the first portion. He states:

1st. That there is still a lack of information on the peculiar culture of the grape, and in regard to the selection of varieties for the Southern States.

2d. The country, by its natural productions, seems to be emphatically the home of the grape, and he urges upon us the cultivation of the native varieties, the employment of the foreign having been repeatedly found not adapted to vineyard culture. Foreign grapes utterly fail after one or two seasons of fruiting; the seedlings also are not better than their parents.

3d. He advises the planting of only a few but well tried varieties.

"Since the advent of the *Catawba*, which gave the start to American grape growing and wine making, and which for many years, with the Isabella, made up the list of the then wine grapes, vine culture has made immense progress, as well in the application of sound principles in its culture, as by the production of numberless new varieties, some of which are now fairly rivalling in quality many of the good European varieties. A few years more of this steady march of improvement, and America will have no need to ask any grapes from Europe or Asia.

"It is true that the cultivation of the grape has not been very remunerative since 1861; but reports from almost every section of the country are more favorable, and give us the hope that the period of decay, which has been so fatal to vine culture, has at last reached its limit, and that a more favorable era is commencing.

"While on this topic of decay a few words are required. Various reasons have been given as to the cause of decay. Neither wet nor dry weather, old or young vines, soils too porous or too retentive, long or short pruning, thorough cultivation or entire neglect, had anything to do with the *general* cause of decay. One or the other of the above may cause partial decay, but it cannot influence the grape crop throughout the country. A soil retentive of humidity will, by itself, be conducive to decay in the fruit; another, of too arid a nature, will fail to supply the requisite sap to the vine when most needed, and by either cause the grape crop will fail. Still we have seen, during the past four years, the reverse of what we could expect. For instance, grapes would rot in a soil which all vignerons would select for the site of a vineyard; and produce sound fruit in a low soil underlayed with stiff pipe clay. This is contrary to all past experience.

"Some years the rot would commence upon the appearance of a rainy season in June; at others, it would be arrested upon the cessation of rain. Old vines in general will fail sooner than younger ones, their vigor being impaired by previous excessive crops. Whenever a wine is allowed to overbear itself, it seldom recuperates afterwards, even if the supply of nutriment is more abundant than is generally the case. We should be satisfied with a moderate crop of fruit; we can expect this for a long period of years; but if the vine is allowed to produce in one year three times as much fruit as it should naturally produce, it is to the detriment of its future fertility and vigor.

"Overbearing, at first or second production, is one of the great causes of the early exhaustion of our vineyards. The land used for a vineyard is generally impoverished by previous croppings. The vine finds in it a few remaining constituents requisite to its growth and production of fruit; being a *voracious* feeder, it absorbs these rapidly and in a short time. A year or two of heavy producing of fruit exhausts the soil of

nutritive elements; and the vine, finding no longer a supply of nourishment, begins to decline in vigor and fertility; and, once stunted in growth, it seldom recuperates, even if the after-treatment is such as to return a new supply of nourishment to the soil. The tendency to overbear should be checked; but how few persons have sufficient courage to cut off a portion of the branches in early spring? It is essential to remove one-half of the branches as soon as they appear; the remaining half will be more developed, the berries larger, the quality improved, the weight of the fruit as large in the end as if all the branches were left, and the vine will not exhaust itself so much. By overstraining nature fails; and it is easier for a vine to perfect a dozen bunches than to attempt to do so for double that number. Our finest specimens of fruits, such as pears, peaches, apples, etc., are the consequence of a moderate crop of fruit upon the trees, caused either naturally or artificially, by removing a proper proportion of the flowers, or, better still, the flower buds, as soon as they appear.

"It is a wrong policy to desire to enjoy too soon; *Festina lente* should be the motto of the fruit grower. To revert to the subject of decay, the main cause seems to be purely '*climatic*,' and can be compared to an epidemic in man, or epizooty in animals; it will make its appearance suddenly, and often as suddenly cease. This was the experience of French vine growers, although the character of the disease there differed from the American grape rot. We may henceforth have a long period of sound fruit crops, and perhaps be visited again by the rot, after a long or shorter time. But one thing is certain, that the decay this year was less destructive than at any period since 1862, the year of its first appearance.

"Can the grape be cultivated here with a fair prospect of profit? is a question that is first asked by new beginners. It can be answered in the affirmative, provided the right varieties be planted.

"The *Concord* has been pronounced at the North and West the grape for the '*million*,' and the poor man's wine grape. This is true for those sections, but not for the Southern States. We have a grape indigenous to the country, which is more deserving that appellation for us; one that will thrive on a rocky hill as well as in a rich bottom; never failing to produce a crop of

fruit; never having been known to rot, and, above all, needing no experienced hand to trim it. I refer to the *Scuppernong.* Its capacity of production is fabulous when compared to other vineyard varieties. Vines planted six years ago upon land that would not produce ten bushels of corn to the acre, in average years, have produced one and a half bushels of fruit each, and this is the fourth crop. They were planted without regard to the arbor training, under which mode the Scuppernong attains its largest size, but simply trained upon a wire trellis four feet high; the distance twenty feet in the row. What will an acre produce at this rate, and what will it produce, if properly trained, and planted in a rich soil?

"Instances of a single vine covering one acre of ground are numerous, and sixty barrels of wine its product in a single season. These are exceptions which vine growers must not all expect to realize; but they are merely given as an evidence of its wonderful fertility. Its culture is the simplest of all modes, and the outlay required to establish an acre is insignificant, as compared with the prices of the new varieties. Enough of the former to plant an acre can be procured for the price of a half dozen *new comers.*

"The next best wine grape is the *Clinton*, whose merits are now sufficiently known to give it its rank among the great wine grapes of the country. It is of Northern origin, but improves as it is brought southward. It is very prolific and makes a heavy bodied claret. Other varieties are coming into notice, and bid fair to make valuable additions to this class of grape: such are the "Tree Seedling," etc.

"Our good table grapes are becoming numerous. First comes *Delaware*, which seem to thrive everywhere South. *Isabella* bids fair to even excel the Delaware; its quality is superior to any of its class; so far it has not decayed, although, from the short time of its introduction South, we cannot form a decided opinion as to its ultimate behavior; still, two years' fruiting, during which it bore perfectly sound crops, and this during a period when many other varieties, of like recent introduction, decayed, is a fair beginning and likely to end well. *Hartford Prolific* is as yet our best very early grape. As a profitable market fruit it stands first in order. The bunches and berries are large, of fine appearance, fair quality, and stands carrying to

market better than any other variety. It is not so liable to drop its berries as in Northern States. Its earliness will always make it command a high price. *Miles* is better in quality, fully, if not a little earlier, but not so fine in appearance.

" *Concord* will long remain as one of our good grapes. Its skin is rather too thin to stand carrying to distant markets; but it is very prolific, of fine quality, and will doubtless make a good wine, although no experiments have as yet been tried upon a large scale.

" *Ontario*, or *Union Village*, when well grown, rivals in size the Black Hamburg. It is a splendid looking grape, of good quality, and has decayed less than many of the heretofore considered reliable grapes. When the *Warren* and *Black July* find a suitable soil and situation, no grape can compare with either in the peculiar texture of the fruit. The vinous flavor of these varieties belongs only to the type of *summer* grape, (*Vitis æstivalis*,) from which they originate, and they are all well described by Downing, when he calls them 'bags of wine.' Other varieties have their merits; but they alone have given more satisfaction generally than others; and we must be satisfied with them, especially if we expect to derive profit from grape growing; and, until better varieties are produced, we must take them, as they combine variety enough to satisfy the most fastidious taste.

"Hybridizing has been much experimented with of late; but very few of the so-called *hybrids* are really so; they are, in most instances, true natives of either the *Labrusca* or *Æstivalis* type. To Dr. Wylie, of Chester, S. C., belongs the credit of having achieved the best results. The thanks of all American grape growers should be given him for his efforts in improving our native varieties by scientific and patient labors, and the fruits of these labors will, at no distant day, largely benefit the country. His experiments have been, by taking the native species as the female, and using the pollen of the foreign varieties as males. The offsprings show more foreign characters than native ones; proving that the experiments were successful. By this process he has produced *Delawares* with the most exquisite flavor of the *Muscats*. *Clintons* as large as Concords, and with a *Muscat* or Chasselas flavor. By cross impregnation, taking his hybrid varieties as male, he has pro-

duced from the wild *Halifax* a most exquisite wine grape; and the most pleasant feature with his hybrids, is that they have not been in the least subject to decay, although he states that the ground in which they are planted is not a suitable one for a vineyard.

"The best soil for a vineyard is a dry calcareous loam, one containing natural salts and a proportionate quantity of vegetable matter. It is futile to expect a heavy grape crop upon soil too poor to be used for the cultivation of corn.

"The different varieties of grapes will make different wines. Nearly all the varieties belonging to the Fox grape (*Vitis Labrusca*) will make a *Hock*. They are better suited to the production of white wines than red ones, when used by themselves. The Catawba, the Venango, etc., give a rough wine, when fermented upon the skins. The Concord, from its thinness of skin, contains less acid matter, and will, therefore, make a palatable red wine. The *Labruscas* should have a portion of *Æstivalis* mixed with them, when a red wine is desired. For instance Catawba and Isabella, with a third; Clinton, Warren or Black July, will give a superior red wine. The Æstivalis class are more akin to the French wine grapes. The Clinton will give a fine Claret; *Ohio*, or *Jacques*, something more resembling a Burgundy; Pauline, Warren and Black July will produce wines varying from a Sauterne to a Madeira. Scuppernong will make a delicious Muscatel. Enough for all tastes; and it is to be hoped that, as we have the elements of success in our hands, we shall no longer allow them to remain unproductive."

The objection to the Scuppernong as a wine grape is that the fruit produces almost singly and not in bunches, and hence is difficult to gather. This, as well as other grapes, grow remarkably well in our common pine land when cleared and prepared—favored possibly by the characteristics of the soil combined with the protection afforded by the pine forest. I hope that in a few years grape culture will be regarded as an industrial resource by those residing in these comparatively sterile regions, and that it will yield employment and profit to our people.

Mr. S. McDowel, of N. C., directed attention to the "Belt of no frost, or Thermal Belt," on the slopes of the Southern Alleghanies. It is a vernal zone which exhibits itself upon our mountain sides, commencing about three hundred feet vertical

height above the valleys and traversing them, he says in his letter, in a perfectly horizontal line throughout their entire length, like a vast green ribbon on a black ground. Its breadth is four hundred feet. Here there is no frost, "and the most tender of our native grapes has not failed to produce abundant crops in twenty-six consecutive years." These should be selected for grape culture as the low valleys are unsuited to it.

See the philosophy of the subject as described by him, in P. O. Rep., 1867, p. 29.

MUSCADINE; BULLACE, (*Vitis vulpina*, L.) A wine may be made from this grape. Two pecks of the mashed grapes are added to one gallon of boiling water; allow it to ferment thirty-six hours; add a little sugar to each gallon and lay it aside. It must not be sealed closely at first.

AM. IVY; VIRGINIAN CREEPER, (*Ampelopsis quinquefolia*, Mx.) Fla. and northward.

Used by the "Ecletics" Dr. Wood states, as an alterative, tonic, and expectorant. The bark and the twigs are the parts employed. Dr. McCall has recently in the Memphis Med. Jour. recommended a decoction or infusion of the bark in dropsy. He believes it to act rather by stimulating absorption than as a diuretic. (Penins. and Independ. Med. J., June, 1858.) See U. S. Disp., 12th Ed.

The "Ivy," (*Hedera helix*,) an exotic, which by its tendrils clings to and covers the walls of brick houses, has been extensively and successfully used at the South during the late war to restore the color of silk dresses—a strong decoction of the leaves, as I am informed, is employed. It owes this property of imparting lustre and freshness to silk no doubt to the resinous *ivy gum* which it contains, a principal constituent of which is *bassorin*.

CORYLACEÆ. (*The Nut Tribe.*)

Properties well known. The seeds oily, and generally eatable; the bark astringent, and often containing coloring matter.

IRONWOOD; HORNBEAM, (*Ostrya Virginica*, Willd., Ell. Sk. *Ostrya carpinus*, Mich.) Richland; Newbern.

Ell. Bot. Med. Notes, ii, 619; Shec. Flora Carol. 355. Its leaves afford a grateful food to cattle. The wood is tough and

white, and burns like a candle. I have suggested this (article in De Bow's Review) as a substitute for wood employed by engravers. It is employed by turners, and wrought into mill-cogs, wheels, etc. A permanent yellow color is imparted to yarn by the inner bark.

The birch hornbeam, (*C. betulus*,) growing in England, is very much used as a hedge plant, and is said to "afford a more uniform temperature of shade than a brick wall." Our species "is the most elegant of all the hornbeams of Britain." Wilson.

"The *sap of the hornbeam* (*Carpinus sylvestris*) is obtained in the months of April and May. At this period it is colorless, and clear as water; its taste is slightly saccharine; its odor resembles that of whey; it reddens turnsole paper. The sap of this tree contains water in very large quantity, sugars, extractive matter, (probably azotized,) and free acetic acid, acetate of lime, and acetate of potash in very small quantities. This sap, left to itself, presents in succession all the phenomena of the vinous and then of the acetous fermentation." Vauquelin's Annales de Chimie t. xxxi, p. 20, first series; Boussingault's Rural Economy, p. 67, Law's edition, 1857.

BEAKED HAZELNUT, (*Corylus rostrata*, Ait.) Grows on the mountains. Fl. March.

Griffith, Med. Bot., 585; Duhamel's Mem. Am. Journal Pharm. Dr. Heubener, of Bethlehem, has employed the short, rigid hairs of the involucre as a substitute for those of mucuna, and has found them equally anthelmintic.

I have collected this plant in fruit on Tiger River, near Reidville, S. C. The hairs are extremely fine, and pierce the skin with facility. I have little doubt with respect to their acting in a similar way with mucuna.

HAZELNUT, (*Corylus Americana*, Walt.) Rich soils; along the margin of woods and thickets. West Florida and northward. Chapman. N. C. Edible.

I have seen the hazelnut growing wild near Summerville, S. C., in Laurens District, and in Powhattan County, Va. Our American hazelnut is said to be preferred to the filbert. Wilson says that the oil which is obtained from hazelnuts by pressure is little inferior to that of almonds; and under the name of *nutoil* is often preferred by painters, on account of its drying more readily than any other of the same quality. Chemists

employ it as the basis of fragrant oils, artificially prepared, because it easily combines with and retains odors. This oil is found serviceable in obstinate coughs. If nuts be put into earthen pots and well closed, and afterward buried eighteen inches or two feet in the earth, they may be kept sound through the winter. In many parts of England hazels (*C. avellana*) are planted in coppices and hedge-rows, to be cut down periodically for charcoal, poles, fishing-rods, etc. Being extremely tough and flexible, the branches are used for making hurdles, crates, and springles to fasten down thatch. They are formed into spars, handles for implements of husbandry, and when split are bent into hoops for casks. Charcoal made from hazel is much in request for forges; and when prepared in a particular manner, is used by painters and engravers to draw their outlines. The roots are used by cabinet-makers for veneering; and in Italy the chips of hazel are put into turbid wine for the purpose of fining it. Rural Cyc. Our species will doubtless answer for all these purposes. Hemp-seed oil also is used by painters. In the countries where yeast is scarce, they twist the slender branches of hazel together, and steep them in ale yeast during its fermentation; they are then hung up to dry, and at the next brewing are put into the wort instead of yeast. Farmer's Encyc.

WHITE BEECH, (*Fagus Sylvatica*, *Fagus V. Americana*, L.) Rich, shaded swamps. Richland; collected in St. John's; Newbern. Fl. March.

Shec. Flora. Carol. 559; Griffith, Med. Bot. 585; Fl. Scotica, ii, 583; Linn. Veg. Mat. Med. 175. The bark is astringent, and has been used, according to Dr. Farnham, in intermittent fever; but it is not possessed of any decided powers. The fruit produces vertigo and headache in the human species. It is observed, in the Fl. Scotica, that "the fat of hogs, which feed on them, is soft, and will boil away." The seeds yield an oil little inferior to olive oil, and fit, also, for burning. The pulp remaining after expression may be converted into flour, similar in taste and color to wheat, but sweeter. A narcotic principle, called *fagine*, has been found in the husks. The young leaves are sometimes used by the common people as a potherb. The wood is valuable to cabinet-makers and turners, for manufacturing purposes—being capable of receiving a high polish.

Every kind of implement, plane stocks, tool handles, may be made of this wood, which resists great pressure. In England the beech is extensively used for umbrella handles. See Dickens' Household Words. Liebig states that the ashes of the beech contains a larger proportion of phosphate of lime than those of any other tree. See his Agricultural Chemistry. It is observed in South Carolina that the lands on which it grows are not usually suited for cotton; and we may, perhaps, attribute it to their depriving the soil of this, so necessary a constituent in the maturation of that plant. In the lower country of South Carolina, the beech is one of the most magnificent of our forest trees. Chapman only includes in his work *F. feruginea*, Ait.

By distilling, says Ure, beech tar (*F. sylvatica*) to dryness with other processes, *paraphine* is obtained. "It would form admirable candles," the author adds, while referring to the production of paraphine as an article of commerce from peat. I insert this here (1862) as deposits of peat are found within the Southern States. The ashes of peat, also, are worth something as manure. They usually, Norton states, contain five or six per cent. of potash and soda, and considerable quantities of lime, magnesia, iron, etc. Soot, a substance somewhat allied, contains a large quantity of ammonia, and is useful as a manure, so much so that when laid on heaps of grass the plants are destroyed. Michaux says that our beech bears a strict analogy with the European beech. The beech should be felled in the summer when the sap is in full circulation; cut at this season it is very desirable. In the *Fagus sylvestris*, white beech, "the duramen or perfect wood, bears a remarkably small proportion to its alburnum. The bark of old trees is used by tanners as a substitute for oak bark." In England beech wood is employed for many purposes—the nuts or mast being given to hogs. See, also, Rural Cyc. The wood of the red beech is stronger, tougher, and more compact than that of the white. In the State of Maine, and in the British provinces, where oaks are rare, it is employed with the sugar maple and yellow birch for the lower part of the frames of vessels. The beech is incorruptible when constantly in the water. The ashes of both species of beech yield a very large proportion of potash. Michaux, who describes the process of extracting the oil, says

that it equals one-sixth of the nuts used. The quality of the oil depends upon the care with which it is made, and upon the purity of the vessel in which it is prepared. It should be twice drawn off during the first three months, without disturbing the dregs, and the third time at the end of six months. It arrives at perfection only when it becomes limpid several months after its extraction. It improves by age, lasts unimpaired for ten years, and may be preserved longer than any other oil. The manner of making beechnut-oil most commonly pursued in the districts of the Western States where the tree abounds, is somewhat different from that described in Michaux's *Sylva*. Instead of resorting to the rather tedious process of gathering the nuts, and pressing them through screw-presses, the farmers turn out their hogs immediately after the first frost, who secrete the oil under their skin. Unless they be fed some time before killing, upon Indian corn, the bacon has little solid consistency, becomes liquid upon the slightest application of heat, and keeps that state, resembling in that respect the lard of hogs fed upon acorn mast. The nuts are only plentiful every third or fourth year. I have observed that the beech growing in the swamps of S. Carolina mature a very scanty supply of nuts. I obtain the following from a journal, (1862:)

Beech Tree Leaves.—The leaves of the beech trees, collected at autumn, in dry weather, form an admirable article for filling beds. The smell is grateful and wholesome; they do not harbor vermin, are very elastic, and may be replenished annually without cost.

CHINQUAPIN, (*Castanea pumila*, W.) Diffused in upper and lower country; sometimes attaining a height of thirty feet; vicinity of Charleston; St. John's; Newbern. Fl. July.

U. S. Disp. 189. The bark has been used in intermittent fever, but is probably possessed of very little value. The fruit is eatable. The wood is finer grained, more compact, heavier and even more durable than that of the chestnut, and is admirably adapted for fence-posts—lasting in the ground more than forty years. Farmer's Encyc. The bloom of this tree and of the persimmon is said to destroy hogs. See following.

CHESTNUT, (*Castanea vesca*, L.) Fairfield District, Florida and northward. In South Carolina only found in upper districts; one of our noblest trees.

The fruit of this tree and the chinquapin (*C. pumila*) are well known. Eaten either raw or boiled. The roots contain an astringent principle; that of the chinquapin boiled in milk is much used in the diarrhœa of teething children. I would advise a tea made of this to be used extemporaneously in diarrhœa by soldiers in camp. The late Dr. Nelson Burgess, of Sumter District, S. C., informed me that at the recommendation of Dr. Jones, he has used the decoction of the root and bark of the chinquapin frequently as a substitute for quinine in intermittent and remittent fever, and with decidedly satisfactory results. I mention this hoping that it will be examined by others. I can have no clue to the reasons of its utility, regarding it heretofore simply as an astringent. Hot water is poured over the root and bark, and a large quantity taken during the twenty-four hours.

Dr. J. S. Unzicker, of Cincinnati, reports the use of a decoction of the leaves of the chestnut in hooping cough. He says that he has given it in about thirty cases, in all of which it gave decided relief in two weeks. He uses a decoction made with three to four drachms of the leaves in a pint of water given *ad libitum*. *Caulophyllin*, in doses of one-fourth to four grains, has also been much used recently in this disease and in asthma. Boston Med. and Surg. J., Jan., 1868. See, also, Bates in Tilden's J. Mat. Med. Sept., 1868, article containing a history of the Blue Cohosh, (*Caulophyllum*.)

The bark of both trees contains tannin, and may be used in tanning leather. In Italy, chestnuts are baked as bread, and there and elsewhere are planted as food for hogs.

Wilson, in his Rural Cyc., says that coppices of chestnut afford an excellent produce every ten or twelve years, for hop-poles, hoops and all kinds of elastic props and handles. "The wood of young chestnuts serves better for gate-posts or for any other purposes which involve constant contact with the ground than any other kind of wood, except yew or larch. It is lauded as a good succedaneum for the coarser kinds of mahogany in the making of furniture." It ranks nearly equal with oak. "Cask staves of chestnut possess the double recommendation of not being liable to shrink and of not imparting a foreign color to liquors which the casks may contain. The wood of the chestnut, though brittle, is very durable in weather. I am informed that

fence-rails made of it will last over twenty years. The trees can easily be raised from the seed.

BLACK OAK; QUERCITRON OAK, (*Quercus tinctoria*, Bartram.) Upper districts; rare in lower; collected in Charleston District; St. John's; North Carolina. Fl. April.

Pe. Mat. Med. and Therap. ii, 194; Am. Med. Record, iii, 363; Barton's Essay to Form. Mat. Med.; Alibert, Nouv. Éléms. de Thérap. i, 93; Mér. and de L. Dict. de M. Méd. v, 590; Edinb. Med. Journal, 72; U. S. Disp. 581; Mich. N. Am. Sylva, i, 91; Journal de Pharm. et de Chim. v, 251; Royle, Mat. Med. 559: Ball. and Gar. Mat. Med. 396; Griffith's Med. Bot. 585; Am. Herbal, 153. The bark, a powerful and valuable astringent, is also possessed of purgative properties, in which respect it has an advantage not met with in the *Q. falcata*. They have both been efficacious in leucorrhœa, amenorrhœa, chronic hysteria, diarrhœa, rheumatism, pulmonary consumption, tabes mesenterica, cynanche tonsillaris and asthma. Oak-balls produced by these are also powerful astringents, and are employed in many cases requiring such remedies—as in diarrhœa, dysentery and hemorrhage; also, in mild cases of intermittent fever. The dose of the powder is forty grains. The powder of this, or of the bark, mixed with hog's lard, is a very simple and effectual remedy in painful hemorrhoids and a decoction is serviceable as a fomentation for prolapsus uteri and ani, and for defluctions from those parts. According to Dr. Cullen, it is applicable in relaxations or impaired conditions of the mucous membranes, on account of its tonic, constringing effect, and as a gargle in inflammation of the fauces, prolapsus uvulæ, etc. Mr. Lizars has used it with "wonderful success" in the cure of reducible hernia. It is applied topically in mortification, and to ill-conditioned ulcers. Marasmic and scrofulous childen are bathed with great advantage in a bath made of the bark. Although this species acts slightly on the bowels, it contains more tannin and gallic acid than the *Q. alba* and *Q. falcata*; hence it is better suited to cases requiring an external astringent. Quercitron is obtained from this and the *Q. falcata* (which see) indiscriminately, and is sent to Europe in large quantities to be employed in dyeing wool and silk of a yellow color.

The bark is a well known and important dyestuff, and is much employed in dyeing wool, silk and paper-hangings. It is said

by Dr. Bancroft, who introduced it into notice, to be equal in power to ten times its weight of woad. With a basis of alumina, a decoction of the bark gives a bright yellow dye; with oxide of tin, it gives a variety of tints from pale lemon to deep orange; and with oxide of iron, it yields a drab color. The cellular integument of the bark is what contains the coloring matter. Wilson's Rural Cyc. "Oak-galls put into a solution of vitriol in water give it a purple color, which as it grows stronger becomes black." Infusions of oak-galls (tannin) are excellent tests of iron. *Gallic acid* is also yielded by the gall-nuts, and by oak bark. The principal barks which are known to yield it are those of the oak, willow, plum tree, the poplar, the elm, the mountain ash, the birch, the elder, the sycamore, the beech and the cherry tree. But it by no means, adds Wilson, follows the proportions of tannin. It is readily, but very slowly obtained from a cold, long-kept and eventually evaporated decoction of galls, or of the tanniniferous barks. Wilson's Rural Cyc. and medical authors.

The best season for *felling timber* is undoubtedly midwinter, the next being midsummer, when the sap is chiefly confined to the young shoots, the circumference of the soft wood and the bark. The worst time for felling timber is the spring, just before the development of the buds, when the tree is fullest of sap. Where much value is attached to the soft or outer wood, felling ought to take place when there is least sap in the tree. In general, all the soft woods, such as the elm, lime, poplar, willow, should be felled during winter; hard woods, like the oak, beech, ash, etc., when the trunks are of large size and valued chiefly for their heart-wood, may be felled at any time. When the bark, however, is to be taken into consideration, as in the oak, the tree should be felled in spring, as then the bark contains four times the quantity of astringent matter to that felled in winter. Brande's Dictionary of Science; Farmer's Encyclopœdia.

All oak bark for the tanner ought at latest to be removed from the tree before the third week of June, "when the sap has begun to rise and before the leaf is completely developed;" and every ton of it, says Wilson, which is removed after the first of July, is not only impoverished in tannin, but weighs two hundred weight less than if it had been removed before

the end of May. Other trees may in England be peeled earlier. The reader interested in procuring barks should read the article, Rural Cyc., "Barking." The best methods of collecting and storing are described. The instruments used in collecting bark are a mallet to beat the bark and a wedge, both made of ash, to insert beneath the loosened bark. The wedge is spatula-shaped. Slight wetting does not injure bark. It is dried in dry, open air, upon supports, so that water will not collect upon it. The bark should be frequently turned. When it is sufficiently dry to avoid fermentation, it should be carried to a dry-house or shade, or stacked in the same manner as hay—in stacks not so large as to incur the risk of fermentation. In the Farmer's Encyc. the plan of removing bark is described. It is stated that tannic acid most abounds when the buds are opening, and least in winter, and in cold springs. Four or five pounds of good oak bark of average quality are required to form one pound of leather. The bark separates from the tree more easily during spring. See Am. Farmer's Cyclopœdia.

See article "Leather," in Wilson's Rural Cyc., for mode of preparing the varieties of leather, tanning kidskins for French gloves, etc.; also "*Rhus*," in this volume.

The editor of the Southern Field and Fireside, April, 1862, states in answer to inquiries "that the bark of the *black poplar* is used in England for tanning, but not, we believe, in this country. It has probably about half the strength of black oak bark. Blackberry briars, roots and stems washed clean (this it will be observed confirms my own observations) supply a good deal of the tanning principle; and our common broomsedge, or straw, has been largely employed in the manufacture of leather in European nations where timber barks are insufficient to meet the public wants. Sumach is exported largely from Sicily for tanning goat and sheepskins. Oak leaves, fennel and May-weed abound in tannic acid, and we intend experimenting with the bark of old field pine for making leather. That it contains tan we know; but whether it will be profitable to peel and use it has yet to be determined. Larch is much used in Great Britain and hemlock at the North."

From a useful communication in the Southern Field and Fireside, October 19, 1861, it is stated that oak bark has sold in the District of Columbia at ten dollars a cord for years; and

that "several million dollars worth of sumach (*Rhus*) is annually imported from the south of Europe into the United States for tanning purposes." The *Rhus* grows abundantly in the Southern States, as well as many other plants containing tannin. I have noticed, in traversing that part of the Dismal Swamp near Norolk, Va., that the *Rhus* is the most characteristic growth. See *Sumach*. It could be procured in any amount. The writer of the article just referred to calls attention to the great amount of goatskins and morocco manufactured and exported from France and England, where tannin is scarce, to this country, where the materials for producing it are abundant, at least in the Southern States. I quote from the writer in the Southern Field and Fireside as follows, and also refer the reader to my own examination of several of the plants growing in St. John's Berkeley, S. C., October, 1862, for the relative amount of tannin in plants. See "*Liquidambar*," in this volume:

"But such is the demand for leather one may well use oak and chestnut bark hewed off at any time in the year. Sumach, fennel and pine bark are much used in Europe. Whether any of our common pine barks contain tan enough to warrfint their use has, we believe, never been tested. Larch bark is much used in Scotland, although only half the strength of oak. Monteath, of Stirling, applied chemical tests to the infusion of different barks with the following results: Oak (coppice) contains most tannic acid; ash and hornbeam next; Spanish chestnut third; willow fourth; birch, beech and larch fifth; spruce and silver firs sixth; mountain ash and broom seventh; and next Scottish pine, bramble or briars, laburnum, and the sawdust of oak timber." My examinations were made before I saw this paper.

Dr. Daniel Lee in the papers published in the Southern Field and Fireside, from which I have drawn largely, earnestly advises us to be more economical with regard to our supply of barks for tanning. "It is poor economy," he says, "for the South to destroy nearly all its valuable tan-bark in clearing oak land, cutting rail timber and firewood, and thereby deprive our children and grandchildren of the power to manufacture their own leather. The time has come when this error must be corrected, or serious injury will be the consequence. To send a million dollars worth of hides to the North, have them tanned,

and the leather made into shoes, boots, saddles and harness for Southern consumption, is to pay about eight or nine million dollars for the support of that Northern economy which never wastes the bark that grows on oak or hemlock trees, and that industry which turns this bark into gold." I know this criticism is partly just; still, the planter at the South cannot often turn to the storing away or sale of all the oak or other bark on his place when he is compelled to clear new land, and can scarcely accomplish that properly; whereas at the North the farmer is compelled to every expedient to add to his resources.

I have endeavored, in the examination made by me to show that the leaves of many of our native trees—such as the sweet gum, myrtle, etc., are rich in tannin, and being easily procured may be substituted for barks, which are difficult to prepare. Mr. Jno. Commins, of Charleston, informs me (1867) that he employed myrtle and other leaves extensively and profitably in tanning leather during the late war, but whether it was original with him, or the result of my suggestion and publication, I do not know. Tanners in the State of New York, Dr. Lee states, save tan-bark enough to manufacture three times as much leather as the four millions of people in that State consume. "Leather is largely exported from New York and Massachusetts to England, the Southern States, and the great prairie West." He condemns "the habit of felling oak trees when the bark will not peel." See "*Quercus*," "*Rhus*," "*Myrica*," and "*Liquidambar*," for notice of plants suitable for tanning leather; also Wilson's Rural Cyc., art. "Currying," for method of preparing and dressing leather, and Ure's Dictionary of Arts.

"*Method of tanning*.—For doing a small business hot water and hot ooze may be best run upon the bark to extract all its tannic acid in a short time; but in a large way either a copper heater should pass through the leech holding bark, or it should be boiled by steam. A copper pan is sometimes used, set on an arch, for heating ooze. A mill for working hides operates precisely like a fulling-mill in scouring and fulling cloth. When dry and weighty, Spanish hides are tanned. Hide-mills have heavy hammers, which are elevated eight or ten inches by a revolving wheel, and fall with an oblique stroke on the hides, that causes them to turn like cloth in a fulling-mill. Any horizontal staff will work a hide-mill, and a horse-power will drive

the shaft. Our friend, Prof. Rutherford, has constructed a horse-power for fifty dollars on his farm (which joins that of the writer) that would drive a hide-mill as easily as it now threshes wheat, and cuts hay and straw for horses. As this is a cheap and valuable power for farm use, it has been our purpose to describe it, which we shall yet do.

"Any mechanic, by seeing the model of a hide-mill, could easily make one. It needs no cast iron double crank like a fulling-mill. The whole affair can be made of wood. Our tanning in the South is many years behind the progress of the age." The reader interested in this subject may consult with advantage Ure's Dictionary of Arts and Manufactures; also an excellent article on tanning and leather, in Nicholson's Encyclopœdia.

I am induced to insert, in connection with the subject of materials for tanning, a communication entire upon the subject from the pen of Dr. Daniel Lee, in the Southern Field and Fireside, November 30, 1861. It contains practical instruction on the subject of manufacture of leather on a small scale by farmers and planters:

"It will be better for several farmers, having from five to ten hides each, to unite in the purchase of a bark-mill for grinding tan-bark, and in constructing a few vats for their common use, than for one to be at the whole expense for so small a business as his own alone. The most primitive way of tanning is in troughs dug out of large trees like pine and poplar; but molasses and bacon hogsheads will form the cheapest tan-vats for the farmer's use. Dig out the earth two-thirds the depth of the hogsheads; pound moist clay over the bottom on which the hogsheads are to stand. Three or four will do for the tanning part of leather-making. Let them not come within six inches of each other, so that moist clay may be pounded closely around each hogshead to within three inches of the top. If bark cannot be ground, it should be broken or cut fine with an axe, so as to fill two of the hogsheads. Heat clear spring or rain-water boiling hot in large pots or kettles, till the bark in both hogsheads is covered with it. Let the bark steep and soak a week or more, while the raw hides are prepared for the ooze and tanning. One hogshead will do for this, but two are better. They ought to stand some yards from the bark-vats,

because lime spattering into the ooze injures it. Surround these with clay like the hogsheads used for tanning.

"After the horns, tail and dew-claws are removed from a green hide, it is split into two halves or sides, from the tail to the nose on the pate. If the hide is dry, it must soak and soften first. After it is split it goes upon the beam, and the operative scrapes and tears off all the flesh, and part of the fascia or membrane which covers the flesh side of every skin. It is now ready for the lime. A half bushel of recently slaked lime, or some less of quick lime, will do for a hogshead nearly full of water. The lime and water should be well stirred with a clean hoe or "plunge" before putting sides or skins into the same. They should be often moved about in the lime water by a lever some seven or eight feet long, and hauled out once a day with an iron or wooden hook such as tanners use. As soon as the hair will slip, sides should be worked over the beam and rinsed in the soak, or water hogshead, to remove the hair and all the lime. The hogshead used as a soak, washed clean, is now to serve as a hen-dung vat or bait. It ferments, and is ripe for use in one or two days, after soaking in a half hogshead or more of water. Much pains and care are used in working sides and skins out of the bait, as they go from this into the tan ooze. They will soon taint and spoil in warm weather. Worked and washed clean, the sides and skins are next handled two or three times a day in tan ooze until they are evenly colored, and get a handsome, fine grain. The handling is done in this wise: Place three or four pieces of plank four feet long down as a platform, so as to slope over the hogshead, and let ooze from the leather, when lifted out of it upon the plank, run back into the hogshead, and not waste upon the ground. Short pieces of scantling or sticks of clean wood lie on three sides of the plank, over which the edges of the two sides laid down extend, and thus form a sort of trough open only at the end that lies over the edge of the hogshead. All the sides are drawn up separate from the liquor with a hook, and spread by hand on the platform, and are thrown back into the ooze again. If the latter is weak, it is half or more pumped out, and fresh, strong ooze is pumped in. The two hogsheads of bark, with boiling hot water, will keep up the strength as fast as ten or twelve sides can possibly absorb it, after starting with two

hogsheads of good ooze. You cannot heat old ooze in an iron vessel, as it would spoil it; but you may, perhaps, obtain a copper still, in which tan ooze may be heated without the least injury to the liquor or the still. The heated ooze is put on the bark, as it is much better than water, where it is allowed to become about as cool as the atmosphere.

"As the tanning advances, skins and hides require less handling. We should hang them across sticks an inch or less in diameter, in and under the ooze. The ends of these sticks or rods should rest on a light frame in the hogshead, and four inches or more below the top. Allowing two inches for each stick and side, fifteen sides would occupy thirty inches in width in the hogshead. Batts and butts hang down near the bottom of the hogshead, where the ooze is strongest. A small hand-pump should be put frequently by the side of the leather and of the hogshead, to lift the ooze at the bottom to the top. Sides are handled a week or too before suspending them separately in ooze.

"As pumping is easier, and less wasteful than dipping, we will state the way in which a cheap and good pump can be made: Its whole length should be some six feet, and the material, plank, not over an inch thick. The open space on the inside for the ascent of ooze or water should be about three inches square. Two strips of plank three inches wide, and two five inches, the latter lying on the former on both sides, will form an aperture in the centre of three inches square. The plank ought to be closely jointed, and either painted or covered with tar or melted pitch to make all the joints water-tight. Of course the nailing should be close and perfect. A box of half-inch plank comes up two inches inside from the bottom of the pump for the leather valve to rest upon.

"One side of the valve is very simple, but not easy to describe. Imagine a funnel made of thin, flanky sole-leather, four inches in diameter across the top, and as many deep down to the neck, and that its centre is nailed or tied fast to a rod that is to serve as a piston in the pump. The weight of water or other liquid to be raised in pumping can set this pliable leather cup to adapt itself to the square shape of the aperture in the pump; and to prevent this cup or funnel falling back in lifting ooze or water, three narrow strips of leather, sewed to the top of the funnel

on three sides, (one on each,) are nailed with small nails to the piston-rod above, say six inches from the funnel. A small but strong wooden pin passes through the end of the rod which, held in the hand, enables one to lift easily all the liquid in the pump. The discharge from the pump is made in the usual way, a foot or more below the top of it. Any one who can use a plane can make a pump of this kind take ooze from the bottom of one vat, tub or hogshead filled with bark or leather, and put it expeditiously into another, where all stand on a level or nearly so. A thin case keeps the tan-bark or leather from filling the little space required by the pump, which is put into the vat or hogshead, and taken out as often as needed. Any blacksmith can make the beaming-knives used by tanners, but not those used by curriers in finishing leather. The former are curved, and often have small teeth to tear up the tough membrane under the skin. All-tan bark should be clean and dry, for dirt and earth blacken leather. Careless persons often get clay and mud into tan-vats, than which nothing is more injurious. Few arts demand equal neatness in their operatives With the most improved apparatus and good bark, the labor of tanning is small. An expert will work one hundred grown hides into the bark or ooze in a month, for which we generally paid twenty dollars; and the labor of tanning two hundred sides was about the same after they came to the bark.

"If a farmer can get his hides tanned and curried for half of the leather they will make, it is probably better than to attempt to tan them himself. Let him improve his pastures by cultivating the best grasses, and raise more fat cattle for home consumption, and thus have three or four hides for the tanner where he has one now. This will call first-class tanneries into existence that will give a pound of good sole-leather for a pound of dry hide, or nearly that. Every farmer ought to spare all the tan-bark he can; for we speak advisedly when we say that the Southern States are even now short of oak bark if they are to manufacture all the leather which they consume in saddles, bridles, harness, saddle-bags, buggy and carriage trimmings, caps, hat-linings, book-bindings, shoes and boots. It has been the misfortune of the Cotton States to underrate all other industries but that of producing their great staple. Hence the scarcity of good mechanics and artisans. Hence we make no

effort to diversify our agriculture, and thereby meet many public wants, while resting our land from the scourge of eternal plowing. That system of husbandry which accumulates the elements of crops and fertility in every acre cultivated, is still a myth to most planters. Southern nationality will expose, and happily correct many errors. We shall learn to make as much cotton and corn on two acres as we now do on six, and at the same time we shall produce tenfold more of the necessaries and comforts of civilized life. Our dependence on foreign industry and skill for so much of what we consume encourages the world to believe that our subjugation is only a question of time. Since the mechanical trades are necessary to our happiness, we should encourage our sons to become scientific mechanics, as well as farmers, lawyers, doctors, and priests and soldiers."

On account of the importance of the subject I insert here the following directions for "*Tanning on the Plantations*," by T. Affleck, from the Am. Agriculturist, also republished in the Southern Cultivator, vol. i, p. 198, the paper by J. S. Whitten, and one in vol. vi, p. 177:

"Tanning leather for the use of the plantation is an item of good management that should not be overlooked by any planter. Nor would it be as much overlooked as it is if the simplicity of the process was generally known—that process, I mean, that will suffice for making leather for home use. The *tanner* by profession, in order to prepare an article that will command a good price in market, and have a merchantable appearance, puts the hides and skins through a greater number of manipulations, and that he may work to better advantage, has his arrangements on a more extensive scale.

"The vats, tools, and implements really needed are few and simple. Four *vats* will generally be found all-sufficient; one for a *pool* of fresh water, and for *baiting;* one for *liming;* another for *coloring;* and a fourth for *tanning.* The best size, in the clear, is seven feet long, four and a half feet wide, and five feet deep. They should be placed so as to be easily and conveniently filled with water from a spring, running stream, or cistern. Dig the holes nine feet by six and a half and six; if the foundation is clay, the depth need not be over five feet. Form a stiff bed of *clay mortar* in the bottom on which to lay the floor, and on it erect the sides and ends of the vat, of plank of almost any kind,

sufficiently thick to resist the pressure from without—two inches will be thick enough. When this is done, and the whole nailed fast, fill in the vacant space all round with *well tempered* clay mortar, ramming it effectually. It is on this, and not the planks, that dependence is placed for rendering the vat perfect. When well made a vat will be good for a long lifetime—the *ooze* preventing the decay of any but the top round of plank. Such a vat will hold fifteen large beef hides, (thirty sides,) besides a number of small skins.

"The material used for tanning is the bark of the red or black oak, stripped when the sap flows in the spring, stocked and dried, of which about four pounds are supposed to be necessary to produce one pound of leather. There is an article occasionally used called "catechu," which is an extract made from the wood of a mimosa tree, a native of India, half a pound of which answers the same purpose. Galls, willow bark, the bark of the Spanish chestnut, and common elm, as also sumach, are all used by the tanner. It has been recently found that the root of the palmetto answers an equally good purpose with the best oak bark.

"Bark has to be ground as wanted; or if the quantity needed is small, and it is not thought advisable to incur the expense of a bark mill, (from $10 to $18,) it may be pounded in a large mortar, or beat up on a block. It will require one-third more of pounded than of ground bark to afford equally strong ooze, which is the infusion of bark.

"The principal tools requisite are a flushing-knife, currier's knife, a brush like a stiff horse-brush and a fleshing-beam. The fleshing-beam is made by splitting in two a hard wood stick of about a foot in diameter; inserting two stout legs, some thirty inches long, in one end on the split side, so that the other end rests on the ground, with the round side up, the elevated end being high enough to reach the workman's waist. A fleshing-knife may be made by bending an old drawing-knife to suit the *round* of the fleshing-beam.

"The skins of bulls, oxen, cows and horses are called *hides*; those of calves, deer, sheep, etc., are known as *skins*.

"Fresh and dried hides receive the same treatment, except in the washing process. Those that are salted and dry, (and no hide should be dried with less than from two to four quarts

of salt being rubbed on the flesh side—dried without salt, it is extremely difficult to soften them;) require to be steeped, beaten and rubbed several times alternately, to bring them to a condition sufficiently soft for tanning.

"Green or fresh hides must be soaked in pure water from twelve to twenty-four hours, to extract all the blood, etc., and soften the extraneous, fleshy matter, which must then be removed—throwing one hide at a time on the fleshing-beam, grain or hair side down, and scraping or shaving it off with the fleshing-knife, which must be somewhat dull or the skin is apt to be cut. They are then put in the liming-vat, which is supplied with strong lime water by filling the vat a little over half full of water, and adding thereto four bushels of unslaked (or of air-slaked) lime, or at the rate of two-thirds of a bushel of lime to the barrel of water. This will suffice for fifteen hides; each time that they are removed and a fresh lot of hides put in, add another bushel of lime, which will keep up the strength for a twelvemonth. Before using stir the lime well up, and while it is thus mixed with the water put in the hides evenly, so that the lime will settle on every part of them. They are to remain here from ten to fifteen days, or for three or four days after the hair will rub off with the finger completely and with ease. While in the liming-vat they must be moved up and down every other morning, to expose them to the air, and to the equal action of the lime. Being now ready for unhairing, cut each hide in two by slitting them along the centre of the back with a knife, forming them into *sides*. Throw ten or twelve of these sides on the fleshing-beam, and strip the hair off with the knife; and as they are unhaired, throw each one into the vat of fresh water to bait or soak. When the lot of sides and skins in hand have all been unhaired and thoroughly washed, throw them again, and at once, on the fleshing-beam, with the grain or hair side up, and work them over (rub and press them) with the knife until all the gummy or mucilaginous matter is worked out. This should be repeated two or three times during ten or twelve days, being each time baited anew in fresh water. And this working over must only be done when the sides feel soft and smooth to the touch; as they will at times from some unexplained cause, feel rough, at which time they must not be worked over. While they are thus boiling they must not be

neglected, or they will soon spoil. Tanners are in the practice of adding one thousandth part of sulphuric acid (oil of vitriol) to the last bait, which has the effect of swelling the pores and distending the fibres, and thus rendering the skins more susceptible to the action of the ooze. Forty-eight hours generally suffices for this last baiting.

"In the meantime, some good, strong ooze should be prepared for the first tanning process, called *coloring*. Fill a vat a little more than half full of water, and add bark, in the proportion of one and one-half bushels of ground, or two bushels of pounded bark to the barrel of water, which will bring the vat up to about two-thirds full. When the bark has soaked from four to five days, the sides are put in and allowed to remain fifteen days; during which they must be *once* well and carefully fleshed and worked over, and must be drawn up and down every morning, for the first week at least, and the bark well plunged or stirred up, to have them color evenly.

"After this, the vat being now two-thirds full of this same ooze, after drawing out the hides lay a good coating of fresh bark, of say an inch thick, on top of the water, on which it will float; lay on this a side, spread out evenly, and if it has to be lapped over in any part lay on more bark until it is all well coated, taking care to place those hides at the bottom of the vat now that were at the top last time. On this side lay an inch-coating of bark, and on that another side, and so on, with alternate layers of bark, until the vat is full, or the sides all laid away.

"In this, which is called the first bark, the sides must lie four weeks. They are then drawn out, and the spent bark taken out with a skimmer or drainer. The sides are then replaced as before, with alternate layers of fresh bark, in the same ooze, which has acquired some additional strength, notwithstanding the amount of tannin and extractive matter contained in the bark that has become intimately combined with the animal fibre of the hide. In this second bark they remain six weeks undisturbed, when they receive a third bark in the same way, in which they are left another six or eight weeks. Three barks will suffice to tan deer, hog, calf and other small skins; four barks will make good sole-leather, but five are preferable.

"The tanning process being completed, sole-leather is taken

out of the vat, rinsed effectually, and dried in the shade, hanging the sides up by two of their corners to joists, where they may remain until wanted. Those sides intended for upper and harness leather, (which are those of cows, etc., the largest and thickest bullock hides being used for sole-leather,) as also deer, hog and other small skins, being thoroughly rinsed, are spread out on a strong table, with the grain or hair side up, and scoured with a stiff brush, like a very stiff horse-brush, occasionally throwing on pure water, until all the ooze is scoured out. Tanners use the edge of a stone, made smooth, to assist in rubbing out the ooze, and all the water that can possibly be rubbed out. They also use what they call a *slicker*, being a dull edge of copper of about six or seven inches long set in a piece of wood, to serve as a handle.

"After they are all served thus, and rubbed as dry as possible, the table is cleaned off and the skins thrown back upon it grain side up, and are rubbed with tanner's oil (codfish oil) as long as the leather will receive it. Harness leather must be completely saturated. As they are oiled fold them up and lay them aside. When they are all gone over lay one on the table at a time, flesh side up, and with a rag rub on all the dubbing that the leather will absorb. Thin hides require but a small quantity; harness leather must have a heavy coating.

"Dubbing, which consists of equal parts of tar and tallow, melted together and well mixed, must be made the day previous to being used. Lard may be used in place of tallow; but will require a lesser proportion of it. Each side of leather is then hung up by two corners to joists, there to remain until perfectly dry, or until wanted.

"If iron or steel touches a hide during the process of tanning when in the least wet, or even moist, it will discolor it, forming an indelible black mark.

"To blacken harness or other leather, take the skin when completely dried, and if any greasy spots appear, showing that more oil or dubbing has been applied than the leather could absorb, wet the spots with a little strong ooze, and scrub them out with the brush. Then apply a coat of copperas (sulphate of iron) dissolved in ooze, until the leather has a good color all over. After this, when dry, put on another good coat of oil. The leather may then be smoothed off with a rounding edge of polished steel, or glass, or stone."

The following is from the Southern Cultivator:

"Having tanned my hides for a number of years, and believing it to my interest, I suppose it will be profitable to others who have many raw hides.

"I have succeeded well, and think my leather firmer, and more valuable for negro shoes and the coarse harness on my farm than tan-yard leather. My plan is a much cheaper one than Mr. Affleck's.

"I tan from ten to fifteen hides a year, of various sizes. I have two vats five by seven feet, four feet deep, sunk in the ground near a falling branch, so constructed at the bottom that I can draw a plug and wash and empty them. I begin in March; soak my hides ten days in running water. Two or three times I take them out and give them a good rubbing or washing. They are then ready for the lime, as we call it. I then put them in one of my vats and divide equally among them from three and one-half to five bushels of good ashes and two or three quarts of lime, and cover the whole in water. The lye had better be strong, and if you err, err on that side. Every few days I take them up, or rather stir them up and mix them again, so that all parts shall be equally acted on by the lye and the atmosphere, in the top and the bottom of the vat. If your lye is right, in ten or twelve days your hides will be thickened to two or three times their first thickness—feel more like a sheet of jelly than anything else—and the hair will slip easily. Then slip off the hair, and with a drawing-knife or a currying-knife scrape off the loose flesh and cellular matter on the other side, and as much of the lye as you can, without bruising the hide; and then put them back into fresh and clean water. Every other day take them up and give them a good rubbing or scouring, for ten days. They are then ready for the bark; and by that time you can slip the bark off your oak trees, and have it ready for the hides. I never grind my bark. I take it from the tree, and with a drawing-knife take off the rough on the outside, and just beat it enough to cause it to lie flat in the vat. In my other vat I do all my tanning, and commence with a layer of bark, then of leather, and so on; and so lay it in the vat that every part of each side of the leather shall lie against bark; and when I am done, I immerse this entirely in water.

"The first year you had better boil an ooze in kettles or pots

and use that instead of water, and afterward always preserve your old ooze to use next year instead of water. I let this lie until the first of August, and put in a second bark precisely as the first, and let it lie until some time in October or November, when my leather is fully tanned, if these directions have been followed. When the leather is well tanned it presents a yellow, spongy appearance, through and through; otherwise you will see a white or hard streak in the centre. When I take it up I scour the ooze well out of all. That I intend for sole-leather I straighten and dry; that for upper leather I wash well, then grease well with the cheapest oil I have, and after drying eight or ten days I moisten it, curry off the spongy, soft part from the flesh side, and when moist, beat it or break it over some rough surface until it is comparatively soft, and the grain side is all puckered up or wrinkled into small wrinkles. Then, when my leather is thoroughly dried and shrunk, it is fit for use."

We have been reading some accounts of a new business which we think may become immensely profitable in Virginia. It is the extracting of the astringent or tanning properties of the oak bark for the production of leather. The information we have convinces us that the business will yield very large profits. An article we have before us on the subject from a Georgia paper says:

"Five-sixths of the leather made in the United States is produced in the New England and Middle States. In the prosecution of this business, Boston and its immediate vicinity alone are said to consume about four hundred thousand cords of crude bark annually, and the enormous consumption which this fact illustrates, is very rapidly exhausting all the accessible sources of supply of the crude material, and raising its value, as the distance from which it must be brought and the difficulties of gathering it increase.

"These facts suggested the idea of inventing machinery to extract and condense the tanning properties of the bark in the original forest; so that a cord of bark is reduced to a single barrel of forty-five gallons. This extract is worth in the Northern cities ten cents a pound or a dollar per gallon—the gallon weighing ten pounds—and the whole barrel, therefore, worth forty-five dollars; and the demand for it in Europe and America can hardly be met by any probable supply. The manufacture

of this bark extract, commencing during the war when the forests of the South were inaccessible, has been confined principally to the hemlock forests of the North and East, which produce one thousand barrels daily—about four-fifths of which go to Europe and the remainder is used principally by the tanners of Boston.

"The machinery for manufacturing this extract is very heavy and effective, and costs from eight to nine thousand dollars. It is driven by a twenty-five horse power steam engine. The bark in slabs, as stripped from the tree, is first soaked in a tank, with water kept at a temperature of one hundred and seventy degrees by steam. It is then passed between iron rollers, which compress it to the thinness of wrapping paper, crushing every fibre and air and water cell in the bark. In this condition it falls into another tank, where it is broken up and beaten, and agitated in warm water by paddle wheels driven at a velocity of one hundred revolutions a minute, and thereafter treated until the water has attained the point of saturation. At this density it is carried to a condenser and further reduced to the desired point of strength for barreling and shipment.

"If all these figures and data are correct, evidently there is an excellent chance for profit from the oak forests of the South. More than this—in the spring of the year the tannic acid has been found by experiments to be much stronger in the young oak leaves than in the bark, and we see no reason why they, too, might not be brought into requisition for the manufacture of this concentrated tanning extract."

A letter from a gentleman in New York familiar with the business says: "The tanning properties of a cord of oak bark reduced to the consistency of ten pounds to the gallon, which makes it imperishable, weighs four hundred and fifty pounds. This is worth in Philadelphia ten cents per pound, and in New York and Boston it commands a ready sale at twelve and a half cents, while in London and Liverpool it sells at fourteen cents in gold per pound. The demand abroad for American oak extract will for many years exceed our ability to supply, while that for home consumption will test our utmost energy to meet. Oak extract at ten cents per pound, when bark can be had at five dollars per cord, will yield to the manufacturer a net profit of twenty-five dollars per cord; and as one machine is capable

of making two pounds per hour, or forty-eight pounds every twenty-four hours, it is easy to compete the returns which may be realized by running it for a single year. These figures may seem incredible to your people, but I challenge any one to show wherein they are incorrect."

Wilson's Rural Cyclopœdia, article "Charcoal," furnishes a table of the proportions, color and quality of charcoal furnished by various trees; also methods of preparing it at the iron-works, with the mode of making lampblack. The willow, alder and dogwood are employed for preparing charcoal for the manufacture of gunpowder. See *Salix*, "*Pinus*."

SPANISH OAK, (*Quercus falcata*, Mx.) According to Elliot, common on the seacoast; collected but sparingly in St. John's; Richland; grows also in Georgia; vicinity of Charleston; Newbern.

Chap. Therap. and Mat. Med. ii, 493; U. S. Disp. 581; Bart. Essay on the M. Med.; Alibert, Nouv. Éléms. de Thérap. 193; Phil. Med. Mus. 11; Mér. and de L. Dict. de M. Méd. v, 586; Lind. Nat. Syst. Bot. 170. This is possessed of the astringent qualities characterizing the genus; it has not, however, the purgative property found in the *Q. tinctoria*. It is employed as an astringent wash for gangrene. A decoction is administered with great success in dysentery, pulmonary and uterine hemorrhage, and some have said, in intermittent fever. See *Q. tinctoria* and *alba*. In domestic practice, where an easily obtained and efficient astringent is required, this, and the more common species, the *Q. rubra*, are of no little value. They are used to a large extent on the plantations at the South.

This and many other oaks produce an excrescence called gall nuts, or oak-galls. These contain tannin and are used for making ink. In a letter from a gentleman residing in Flat Rock, N. C., I am informed that he obtains the greatest relief in piles by the application of the fresh oak-gall rubbed up with mercurial ointment. He found it better than any application he had ever used. They are used when fresh.

WHITE OAK, (*Quercus alba*, L.) Diffused; St. John's; vicinity of Charleston; Newbern. Fl. May.

U. S. Disp. 582; Royle, Mat. Med. 659; Griffith, Med. Bot. 586. The bark is officinal, and is generally used in similar cases with the above, with the exceptions before mentioned.

By some it is preferred to the others on account of its not acting on the bowels. The decoction is sometimes employed as an injection in leucorrhœa and gonorrhœa. The bark contains tannin, gallic acid, and bitter extractive, the former predominating. The bark is officinal, the young bark being preferable. The whiter bark, and the delicate and finely lobed leaves, with the general neat appearance of the tree, serve to distinguish this from the other varieties of the oak, than which it is more acceptable to the stomach. All, however, are valuable for external application. It is astringent and somewhat tonic. Powder: dose, from one-half drachm to one drachm. Extract: dose, half that of the powder. Decoction: bark bruised, one ounce; water, three half-pints; boil to one pint. Dose, one wineglassful. Surg. McLauglin and others of Lynchburg, report through the Surgeon-General's office C. S. A. a favorable notice of the decoctions and syrups of the *Quercus alba* and *Rubus villosus* in chronic diarrhœa, stating that the tinctures of *R. V.* and of *Cornus Florida* make an excellent astringent tonic.

This is one of the most valuable of our forest trees, and it is largely employed for manufacturing purposes, and in the domestic economy of the plantations in the Southern States. The wood is hard and durable. The following I obtain from a journal, (1868:)

A Charleston letter to a Northern paper says: "A singular flowing back of one of the great currents of trade is indicated by the fact that during the present month eight large vessels have cleared at this port, loaded with lumber for Maine. This is 'carrying coals to Newcastle,' yet the white oak of South Carolina is superior for ship timbers to any tree in the forests of Maine, while the roots of the yellow pine are far better than those of the tamarack for ships' knees, both in shape and durability."

The following table is the result of the experiments of Barlow upon the "Absolute strength of different kinds of wood drawn in the direction of their fibres." Wilson's Rural Cyc. on the strength of materials may be consulted. Article from Renwick's Elements of Mechanics:

Boxwood	20,000 lbs.	English Oak	10,000 lbs.
Ash	17,000	Am. White Pine	9,900
Teak	15,000	Pear Tree	9,800
Norway Fir	12,000	Mahogany	800
Beech	11,000	Elm	5,800
Canada Fir	11,000	Cast-steel was	140,000
Russia Fir	10,700	And Gold	80,000
Pitch Pine	10,400		

"Absolute cohesive strength of wood drawn in a direction at right angles to the fibres:"

Teak	818 lbs.	Canada Oak	588 lbs.
Am. White Pine	757	Pitch Pine	588
Norway Fir	648	Elm	509
Beech	615	Ash	359
English Oak	598		

The following table gives the "respective strength of various substances:"

Metals.		*Wood.*	
Wrought-iron, Swedish	22,000 lbs.	Teak	4,900 lbs.
" English	18,000	Ash	4,050
Cast-iron	16,000	Canada Oak	3,500
		English Oak	3,850
		Pitch Pine	3,250
		Beech	3,100
		Norway Fir	2,950
		Am. White Pine	2,200
		Elm	1,013

English oak resisted a greater amount of pressure, by Rennie's experiments, than many other kinds of wood; three times as much as elm, for example. See, also, article "Timber," in Rural Cyc., for method of preserving, relative strength, etc. In England the shipwright considers that three years are required thoroughly to season timber. Timber is best preserved by immersion in water for six months, and the exposure to shade for another six months. The white oak cleaves and splits readily, and is used in making plantation baskets. I have seen it used in place of cane in making chair seats. The white oak lasts longer in weather than hickory.

White Oak Baling.—White oak slats, basket fashion, take the place of gunny bagging, and hoops of the same wood take the place of rope. With machinery for cutting the slats, two hands can get out enough for one bale in twenty minutes.

I will introduce under the genera "*Quercus*" and "*Carya*," what I have thought useful on the subject of ashes, pearlashes, potash, soap, etc. Information is required on these invaluable substances. For processes, see Ure's Dictionary of Arts. For "soda," see "*Salsola*," in this volume.

"*A cement for cisterns*, as hard as marble, and impenetrable by water forever," is made of wood ashes two parts, clay three parts, sand one part, mixed with oil—all ingredients easily obtained."

"Concentrated Lye" is a very pure preparation of caustic soda, or soda ash purified. The following is the method of making hard soap with this substance, which is preferable to potash or any of its preparations; it is also very economical: "One half box of concentrated lye, four pounds of grease, one pound of rosin, five gallons of water. Boil all together until the soap is made—a point easily determined; then add a half pint of salt dissolved in a quart of water, boil a few minutes longer, and pour off into tubs to harden. This will yield about thirty pounds of excellent hard soap, at a cost of about two and a half cents per pound."

The following general deduction, which is instructive, is made in Wilson's Rural Cyclopœdia, art. "Ashes:" "Trees, in a general way, make a plentiful yield of potash, somewhat in the degree of their hardness, their heaviness and the closeness of their texture; and the chief of them may upon this principle be distributed into four classes—first, the oak, the ash, the yew, the beech, the chestnut, the pear, the crab, the blackthorn and the broom; second, the elm, maple, hornbeam and white-thorn third, the pines and firs; and fourth, the birch, alder, poplar, hazel and willow. When six loads of the ashes of the first class are sufficient for an acre of land, ten or twelve loads of the ashes of the fourth class may be required." It will thus be seen what room there is for selection in using trees for ashes or for the production of potash. For further information on potash, ashes, soaps, hickory, consult "*Carya*" in this volume.

Table of mean results of experiments of Messrs. Kerwan, Vauquelin and Pertues, upon ten thousand parts of each plant—amount of potash in each—(Chaptal:)

Elm	39 of potash.	Fern	62 of potash.
Oak	15 "	Cow Thistle	196 "
Beech	12 "	Wormwood	730 "
Vine	55 "	Vetches	275 "
Poplar	7 "	Beans	200 "
Thistles	53 "	Fumitory	890 "

In selecting plants to burn for potash, which can be done on any plantation, those which are thus seen to yield most should be chosen. "Grasses, leaves, the stalks of French beans, of peas, melons, gourds, cabbages, artichokes, potatoes, maize and garget, are very rich in this alkali." Thistles, nettles, broom-heath, brambles, ferns, should all be collected. The fumitory and wormwood (exceedingly rich in potash) are both grown in the Southern States. The plants are first dried and then burned and the ashes leached, which should be repeated. Hot water is better than cold. The potash can easily be extracted from the lye by evaporation. "The process," says Chaptal, "may be commenced in a copper boiler, into which a very fine stream of the lye should flow to replace that which evaporates; when the liquor has acquired the consistency of honey it should be put into iron boilers to complete the operation. As the substance thickens, care must be taken to remove that portion of it which adheres to the sides, and to stir the whole carefully with iron spatulas. When the substance congeals and becomes solid upon being exposed to the air, it is poured into casks and and thrown into commerce, under the name of salts. The whole process is simple, and may be conducted upon our farms without any difficulty." Pearlash may be procured from the potash by calcination. See treatises on the Arts.

The following observations may be found useful to the soap manufacturer, even if he be a planter or farmer, which I quote from Thornton's Family Herbal: In the large manufactories the lye for making soap should be made no stronger than to float a new laid egg when the workmen begin to form the mixture. The oil or tallow is first boiled with a weak lye until the whole is formed into a saponaceous compound. It is then kept boiling with a stronger lye until it acquires a considerable consistence, and seems to be separating from the fluid below. This separation is a very material part of the operation, and to effect it completely a quantity of common salt is added; the materials

are continually boiled for three or four hours, and then the fire is withdrawn. The soap will now be found united at the top of the liquor, or what is called the waste lye, which is of no further use, and is therefore drawn off. The soap is now melted for the last time with a lye, or even with water. It is then allowed to cool, and afterward cast into wooden frames. The last melting is important, as giving compactness. A solution of sulphate of iron will mottle soap by dispersing it before the soap hardens throughout the mass.

A most economical mode of washing, which has been employed by farmers, which *reduces the labor of days to that of a few hours*, might be adopted in armies. The washing of an entire regiment, when in garrison or in cities, might be done systematically and collectively with far less exposure and loss of time. I obtain the method from some of the journals:

On the night preceding the day intended to be set apart for washing, the clothes, white and colored, coarse and fine, are put in tubs of clear water, where they remain all night. A large size vessel, the larger the better, is half filled with water, which is raised to the boiling point. To one containing sixty gallons put two teaspoonsful of sal soda, one quart of soft soap, and one quart of lime water, made by pouring three gallons of water on one quart of lime the night previous, so that it may have had time to settle, and in proportion if smaller vessels are used; stir the water and ingredients well together, when the clothes are put in, and boiled rapidly for an hour; they are then taken out and rinsed well. The same lime water may be kept until it is all consumed. The receipts for making the soap is as follows: The ingredients for one hundred pounds do not cost more than one dollar and fifty cents. Take six pounds of potash, four pounds of lard, one-fourth pound of rosin; beat up the rosin, mix all together well and set aside for five days; then put the whole in a ten gallon cask of warm water, and stir twice a day for ten days; at the expiration of which time, or sooner, you will have one hundred pounds of excellent soap. Strong lye water or concentrated lye may perhaps take the place of the potash. A gill of alcohol added to a gallon of soft soap, applied to clothes in the usual way, and soaked several hours before washing, furnishes an economical method.

Lye from wood ashes added to tallow, eight ounces to two

pounds, melted over a fire, it is said, greatly increases the hardness of the candles made from it.

RED OAK, (*Quercus rubra.*) Diffused; grows in great abundance; St. John's; Charleston; Newbern. Fl. April.

U. S. Disp.; Griffith, Med. Bot. 587. Employed like the others as an astringent; as a drying astringent powder it may be used in place of the Cinchona bark. It is easily obtained and conveniently prescribed. I have myself found the bark of the tree of some service among negroes, in several cases where a tonic astringent injection was required, using it in cases of prolapsus uteri, where the organ became chafed and painful from exposure. The decoction of the bark, with sulphate of copper, is employed on the plantations to dye woollens of a green or black color, and for tanning leather. Hickory bark, with copperas, furnishes an olive color; maple gives a purple dye, the tea leaf (*Hopea tinctoria*) a yellow, and white oak a brown. Walnut leaves or roots, without copperas, repeatedly boiled, yield a black dye. Blacksmith's dust may be used in place of copperas. The wood is not so durable as that of the *Q. alba*, but it is much used for domestic purposes.

The following methods of making ink were furnished to Dr. Bachman by Mr. E. Ruffin; only native plants are required:

Three different modes to make good Ink.—No. 1. Take one measure (or one handful of each half pint of ink intended to be made) of maple bark and as much of pine leaves, both fresh and previously and separately chopped to pieces of not more than half an inch long. Put them into an iron vessel and add two measures of water. Measure the then depth of the water and mark the height of surface on a pointed stick thrust to the bottom. Then add six more measures of water, (making eight in all.) Boil very slowly (or simmer) until three-fourths of the fluid has evaporated, which may be known by its then surface reaching the mark on the measuring stick. Then remove the vessel from the fire, and add, for every half pint of remaining fluid, one teaspoonful of copperas, as much sugar and a tablespoonful of vinegar—stir and let stand from twelve to twenty-four hours. Then strain the fluid (ink) from the solid refuse through a coarse cloth and bottle for use.

No. 2.—First, make a strong infusion of the inner bark of red oak, by standing in water twenty-four hours, a handful of

chopped bark for each half pint of water. (Or, otherwise, make a decoction, by boiling an hour and evaporating to the same quantity of water.) Decant the fluid and add about a teaspoonful of copperas for every half pint of fluid and keep for the use next to be directed.

Take of ripe elder berries four measures, in a washbasin. Mash them well in the hands. Put the mixture of pulp and fluid juice into an iron vessel. Measure the depth of the whole mass, as directed for No. 1. Then add one measure of the before prepared infusion of red oak bark, and boil very slowly until evaporation has reduced the quantity of fluid to what it was at first of the mashed elder berries alone. Remove the pot from the fire. Put in a teaspoonful of copperas for every expected half pint of fluid, and let the mixture stand for twelve or twenty-four hours. Then strain through a coarse cloth, using strong pressure. Bottle the fluid for use.

No. 3.—Fill an iron pot half full of white oak bark, (coarse or fine,) one-fourth full of red oak bark, and one-fourth full of maple bark. Fill the pot with water and boil slowly and for a long time. A teaspoonful of copperas will set it. Strain and bottle for use.

To dye a Blue Color without Indigo.—Make a strong dye of red oak bark, another of maple bark, and have in a third vessel a weak copperas water, and in a fourth vessel a weak lye. Wet the cotton thoroughly in each vessel of dye and rinse it out in the order in which they are mentioned, having each fluid as hot as the hand can bear, repeating the process until the color is sufficiently deep. By making the thread a deep copperas color first and then going through the process you can have a good black.

Quercus montana, Willd. Rocky soils in the Alleghany Mountains of South Carolina. Used as a substitute for the above.

LIVEOAK, (*Quercus virens*, Aiton.) Grows abundantly on the seacoast, for the space of sixty miles from the ocean; Newbern. Fl. June.

U. S. Disp. 581; Eberle, Mat. Med. i, 376. This tree is of quick growth, and attains a large size in South Carolina. Its great value for manufacturing purposes, ship-building, etc., is well known. It is often exported for these purposes, to great advantage. Its branches extend out to some distance, and it

affords one of our most venerable, magnificent, and ornamental shade trees, suited for avenues. The acorns are edible.

Density of Wood.—I introduce the following under this species. Count Chaptal, in his Chemistry applied to Agriculture, makes the following remarks: "Soil, exposure, climate and season modify in a remarkable manner the fibre of vegetables of the same kind. Vegetables raised in a dry and arid soil have a much harder and more compact texture than those of the same kind raised in a moist and rich soil; they have more perfume, contain a greater quantity of volatile oil, are decomposed with more difficulty, and during the combustion give out a much more intense heat. Every one knows that thickets having a southern exposure yield better fuel than those which lie toward the north; the wood is more solid, and after having been cut, it will resist for a longer time the action of air and water. This fact was observed by Pliny, in regard to the woods of the Appenines."

The difference between the hardness of trees growing in swamps and highlands is, I believe, referred to by Boussingault. The locality and the season of the year should have an influence upon the tree, upon its structure, and secretions, and they should be considered, in reference to the growth of timber for ships, implements, etc. The best time for cutting wood is in the end of the winter, when the texture is hardened and condensed by the cold. Boussingault, in his work on Scientific Agriculture, describes a French method of preserving timber, superior to the Kyanized, by the absorption of the salts of iron. I would refer the curious reader to a paper, giving a most remarkable account of the enormous size and height of the trees, and the vegetable wonders of California, in Patent Office Reports, p. 4, 1851, by Wm. A. Williams. Trees sixty-eight feet in circumference, and three hundred and eighty feet in height, without a branch for two hundred and sixty feet; vegetables relatively large. See Boussingault's work for similar statements. The general reader will find interesting references to such matters in Prof. O. W. Holmes' book, the "Philosopher at the Breakfast Table;" also, paper in Patent Office Reports on Agriculture, p. 655, 1851, by Thomas Eubank, Commissioner, containing extracts from writings of M. M. Naudin and Lecoq, (report to the French Academy,) on the taming of plants by

cultivation; they "tamed every individual species of the fierce family of thistles," converting them into a savory vegetable.

It is well known, says a writer in the Patent Office Reports, 1852, p. 257, that the most valuable timber is that which has attained its growth with most light and air. The wagon-maker takes care to combine toughness and durability by selecting his wood from trees of second growth, or from trees of first growth that from infancy have stood alone, or far apart. I have ascertained, in conversation with machinists and wood-cutters, that they separate many species of useful trees into two varieties, and make careful selection in cutting for the shop.

SWAMP CHESTNUT OAK, (*Quercus prinus*, L.) Vicinity of Charleston; Newbern. This may be used medicinally as a substitute for the *Q. alba*.

CHESTNUT OAK, (*Quercus castanea*, W.) S. and N. C.

This is said to be the best for tanning as it gives a bright appearance to the leather. The wood is soft and easy to split.

CORK TREE, (*Quercus suber.*) Exotic.

The Patent Office has distributed for years past seeds and plants of the cork tree. See Reports, 1854, p. 32, for mode of culture and gathering of cork; and article on "Properties and Uses of Cork Tree." Patent Office Reports, 1858, p. 335.

Quercus.

For method of raising acorn-bearing oaks, for feeding of hogs, varieties, etc., see Wilson's Rural Cyclop., art. "Acorn," "Oak." In some portions of England hogs are raised almost entirely upon acorns, and with but a limited supply of grain just before killing. "The farmers of Gloucestershire bestow nearly as much care upon the fruit of their oak trees as upon the produce of their orchards; they seldom sell their acorns, yet usually estimate their value at from 1s. 6d. to 2s. per bushel," etc. Wilson. See, also, Boutcher's "thoroughly practical" Treatise on Forest Trees. See Boussingault's Agricultural Chemistry, and Wilson's Rural Cyc., for method of preserving timber.

BETULACEÆ. (*The Birch Tribe.*)

Bark astringent; sometimes employed as a febrifuge.

SWEET BIRCH; BLACK BIRCH; CHERRY BIRCH, (*Betula lenta*, L.) Mountain mahogany. Mountain ridges of S. and N. Carolina.

U. S. Disp. 1233. The bark and leaves possess a very aromatic flavor. An infusion of them is useful as an agreeable, gently stimulant, and diaphoretic drink. The oil, obtained by distillation from the bark, has been shown by Proctor to be similar to that of the *Gaultheria procumbens.* (See index.) It also affords a saccharine liquor. Am. Journal Pharm. xv, 243 ; Ell. Bot. ii, 617. The wood, possessing a fine grain, which is susceptible of a beautiful polish, is much used by cabinet-makers. It would be adapted to the fine work on railroad cars. Is the handsomest of the species, and has the finest timber. "The timber, when fresh cut, has a rosy tint, and afterward deepens in color by exposure. It has a fine, close grain, and is susceptible of a very high polish. It is used for sofas, arm-chairs, the frames of coach panels, and various other purposes." Wilson; Michaux's Travels, etc.

"The *Sap of the Birch tree* reddens turnsole intensely. It is colorless, and has a sweet taste. The water which forms a greater part of it holds in solution sugar, extractive matter, acetate of lime, acetate of alumina, and acetate of potash. When properly concentrated by evaporation, it ferments on the addition of yeast, and then yields alcohol on distillation. The presence of the acetate of alumina may appear extraordinary in the sap for this reason, that alumina has not yet been discovered in the ashes of the birch tree." Boussingault's Rural Econ. p. 65, ed. 1857.

RED BIRCH, (*Betula nigra*, Linn. *B. rubra*, Mx.) Vicinity of Charleston; collected on the Santee River, St. John's Berkeley; Newbern. Fl. March.

Ind. Bot. Dr. Green states that a strong decoction of the bark cured cases of putrid sore throat. It is useful also in pleurisy. Lindley says that the black birch of North America is one of the hardest and most valuable we possess. This might suit the purposes of the engraver, and in the construction of any implements requiring wood of firm texture. We have also the yellow and the cherry birch. The shoots and the twigs of the *B. lanulosa*, or *B. nigra*, said by Wilson to grow in the Carolinas, are used for hoops, and "made into excellent street brooms." Its wood is compact, nearly white, and streaked longitudinally, and useful for various economical purposes. Consult "*Alnus serrulata.*"

ALDER, (*Alnus serrulata*, Aiton.) Grows along rivulets, Charleston District; Richland; Newbern. Fl. April.

U. S. Disp. 1224. The bark is astringent. N. Y. Journal Med. v, 7, 8. It had for a long time been neglected; but in the article referred to the decoction is spoken highly of as an alterative and astringent in scrofula and cutaneous diseases, and it is said to have been very successful in hæmaturia; in these affections producing beneficial results where all other means had failed. Shec., in his Flora Carol., spoke of the alder tags as being of great service on account of their alterative powers; a decoction of the leaves has also been used to suppress hemorrhage, and they have been found effectual in relieving dyspepsia and bowel complaints. An astringent decoction may be made of the bark, leaves, or tags—acting also as a diuretic. A tincture may also be used. Poultices made of them are used as a local application to tumors, sprains, swellings, etc. The leaves are applied externally to wounds and ulcers. The inner bark of the root is emetic, and it has been given in intermittents. It is used by tanners and dyers; the shoots, cut in March, will impart a cinnamon color to cloths and flannels. The black alder is used to *color flannels:* "Take the bark, boil it well, then skim or strain it well; wet the cloth in a pretty strong lye and dip it into the alder liquor; let it remain till cool enough to wring, and it gives an indelible orange color." The wood does not absorb water easily, and is employed in making posts, and any structure liable to be submerged. The English *Alnus* (*A. glutinosa*) is planted along the side of water-courses, rivulets and sand-banks, to prevent the encroachment of water by the hardening and binding influence of the roots upon the soil, and also as a border to conceal unsightly or boggy lands. The wood is suited for pipes, pump-trees, and all kinds of subaqueous wood-work, "where it will harden like a very stone," says an old writer; now superseded, says Wilson, "for even these purposes by the Kyanized wood of more close grained trees." The wood of this is also used for various purposes of the turner, for the cogs of wheels, etc, "Charcoal made of its timber has long been highly valued for the manufacture of gunpowder." Wilson's Rural Cyclopœdia, art. *Alnus*. I do not know how closely our *A. serrulata* and *A. viridis* resemble the English tree. The bark of alders is astringent, and is used by

tanners and dyers; see Wilson. It is, in other words, rich in tannin. The birch, (*Betula nigra*, L.,) in fact all of our species, no doubt, contain a certain proportion of the gummy, oily substance peculiar to the *B. alba* of England. The flowers of the latter are highly odoriferous, and the oil is collected. The bark is also used by the tanner. Russia skins are said to be tanned with it, hence the peculiar odor. Our species of birch may no doubt be used for similar purposes. I have little doubt, in consideration of the possession of an astringent and oily, resinous principle, that a tincture of the catkins would serve as an excellent astringent, stimulating diuretic, to be used in gleet, gonorrhœa, and in chronic diseases of the genito-urinary apparatus.

Birch wine is also made in England from the sap of the birch. The papery sheets of birch bark were used as a writing material.

URTICACEÆ. (*The Nettle Tribe.*)

DWARF STINGING NETTLE, (*Urtica urens*, L.) Introduced. Grows around Beaufort; collected in Fairfield District; Ell. says at St. Mary's, Georgia; vicinity of Charleston; N. C. Fl. February.

Murray's App. Med. iv, 592; Bull. Plantes, Vén. de France, 170. It causes an excessive discharge of urine, and Sérapion said that thirty grains of it would purge. In the Supplement to the Dict. de Mat. Méd. by Mér. and de L., 1846, p. 719, we have an account of the remarkable hæmostatic virtues of this and the *U. dioica*, also found in South Carolina. It had originally obtained some favor in this respect, and was used by Sydenham, but had for a long time fallen into disrepute. It has been reserved for M. Guinestet to restore the public confidence in it; and it is now spoken favorably of by Chomel, Lange and Desbois. Guinestet advises it in hemorrhage, and reports five cases of uterine hemorrhage in which bleeding was instantly arrested; two to four ounces of the juice were given, taken internally and in the form of injection. It has also been successfully employed in spitting of blood and epistaxis, and cases of two months duration were cured. The objections of others who were not so successful have been satisfactorily answered, its pretended therapeutic action being denied by Drs. Kasciakewies and Fiard, who report a case of poisoning from

the internal use of two ounces of the concentrated decoction. The supporters have produced well sustained arguments destroying the force of these statements; and Mérat himself speaks favorably of it in an official report made to the Academy, and published in the Bull. de Thérap.; he furnishes a case of nasal hemorrhage, occurring in a girl who was giving birth to a child, and who was at the same time flooding, both of which he succeeded in arresting with the juice of this plant, when everything else had failed. Many others have used it with very favorable results in this and in leucorrhœa. "Spérons," adds the author of the Dict. de M. Méd., "que l'expérience confirmera ces heureux résultats." See Amusat's, Chevalier's and Mérat's Rapport "sur l'emploi du suc d'ortie comme antihémorragique," made in 1846, in the Bull. de l'Acad. Royale de Méd. ix, 1015. Dr. Menicucci, of Rome, introduces into the vagina a sponge soaked in the juice; and it may be at the same time administered internally. See Abeilhé Médicale, Mai, 1846. M. Guinestet attributes its hæmostatic virtues to a constituent which coagulates milk in the same way that poisons do. See a letter of Mérat, relating a case of uterine hemorrhage existing for two months, which was cured by the juice of the *U. dioica* (in French.) Idem. x, 364, 1845; Mér. and de L. vi, 875; Journal de Méd. vi, 492. By analysis, it contains a carbonate, ammonia, chlorophyl, mucus, black coloring matter, gallic acid, tannin and nitrate of potash, less abundant than in the *U. dioica*, (which see.)

Induced by these notices to test it myself, I succeeded in obtaining a quantity of the *U. urens* from Fairfield District, S. C. Assisted by Dr. R. A. Kinloch, of Charleston, I proceeded to expose and divide the right common carotid arteries of two sheep, upon the bleeding orifices of which was applied lint covered with a sponge soaked in the cold infusion and the decoction respectively. The results were as follows: the first died from improper manipulation; in the second, the bleeding ceased entirely—the animal was killed, however, a short time afterward. The juice of the plant seemed to have some effect in coagulating fresh blood poured out into the hand. Upon giving the cold infusion, made with two ounces of the plant to a pint of water, in doses of a wineglassful four times a day, to a patient affected with chronic hæmaturia, who had used tannin, gallic

acid, and the infusion of buchu ineffectually, she confessed having derived decided relief from it, but complained of its having brought out an eruption over the body. The experiments in both cases are obviously too meagre to enable me to pronounce positively as to the amount of power the plant possesses. Dr. W. B. Johnson, of Marion, Ala., has found this plant very efficacious in uterine hemorrhage. U. S. Disp. from N. O. Med. and Surg. J. vi, 452. The irritant effect of the nettle applied to the skin is said to be owing to the presence of free formic acid in the sharp hairs. U. S. Disp., 12th Ed., from Am. J. Pharm. xxii, 181. Celsus employed the *Urtica* in paralysis. De Re Medica, l. iii, 27; Bull. des. Sci. Méd. ix, 77. Flagellation with the branches, which, it is well known, contain stings which produce great irritation, followed by inflammation, has been recommended for bringing out cutaneous and febrile eruptions, as in scarlatina, in apoplexy, in insensibility of organs, in poisoning by opium, in chronic rheumatism, and in fact whereever a powerful external stimulating revulsive is required. For this purpose it has even been employed in the algid period of incurable cholera morbus. Dr. Marchand, Séance de l'Acad. Roy. de Méd. ii, July, 1832; J. Stevoght, Diss. de Urtica, 1707; J. Francus, Tractatus Singularis de Urtica Urente, etc. Dilleng, 1726. Both this and the *U. dioica* are found in the Southern States, and I would invite further and particular examination into properties which are of so valuable a description. I observe no notice of these experiments in the American works. The minute structure of the sting is said to be very curious.

COMMON OR RED DEAD NETTLE, (*Urtica dioica*, L.) Grows along roads and fences; vicinity of Charleston. Fl. Aug.

Dém. Élém. de Bot. iii, 338. It is applied extensively as a stimulating and anti-septic astringent and detersive, the herb and seed being used; the decoction is also alluded to in this work as being used in hemorrhage, bloody urine, etc. Urtication with this also was employed in rheumatism, paralysis, etc. (See *U. urens.*) The root is advised in jaundice and nephritic diseases. Fl. Scotica, 57. A rennet was made with a strong decoction. One quart of salt was added to three pints of the decoction, and boiled for use, a spoonful of which was sufficient to coagulate a large quantity of milk. Stearns, in the Am. Herbal. 136, refers to its use in jaundice, nephritic disorders, and

in hemorrhage. "The juice snuffed up the nose stops bleeding, and a leaf put on the tongue, and pressed against the roof of the mouth, will answer the same purpose." Thornton's Fam. Herbal. Linnæus, in his Veg. Mat. Med. 511, alludes to its employment in hemorrhage; it was considered lithontripic and emmenagogue, and adapted to those in whom the hemorrhagic diathesis prevailed; all of which opinions I quote, as coming from old authors. "Steel dipped in the juice becomes more flexible." The seeds produce an oil, which, taken in moderate quantities, excites the system, especially "*les plaisirs de l'amour.*" Twenty or thirty grains of these induce vomiting, and a few of them, taken daily, are said to reduce excessive corpulency. Mér. and de L. Dict. de. M. Méd. vi, 613. By Salladin's analysis, in Journal de Chim. Méd. vi, 492, the plant contains nitrate of lime, hydrochlorate of soda, phosph. potash, acetate of lime, ligneous matter, with silicate and oxalate of iron. Pallas, Voyage, i, 700; Gmélin, Flora Siberica, ii; Mathiole, Comm. 560. It is said that animals which feed on the plant become both fatter and stronger. Mém. de Hærlem, xxvi. The stalks have a fibre like hemp, and have been employed for making cordage; the root boiled in alum will dye a yellow color. See Hooke's Microscop. Diss. xxii, 12, and Guettard, Mém. de l'Acad. des Sci. de Paris, 1751, 350, for a description of the structure of the sting, and the Petersburg Journal, 1778, 370, for a notice of the value of the stalks in making ropes and paper. The U. S. Disp., 1303, barely notices the plant. Late experiments may have escaped the attention of its indefatigable authors.

The nettle plants are known to be closely allied to those bearing textile fibres, and indeed thread can be made from all the nettles. Experiments may be made in the Southern States upon the yield of fibre from the *Urtica urens* and *dioica*, which grows spontaneously. Boiling in alkaline solutions and lime water is used in the preparation of such plants. See next article, Ramie; also, "*Apocynum.*"

The common nettle, remarks Mr. Lawson, who ranks it with flax, hemp, cotton, phormium and other fibre-yielding economical plants, has been long known as affording a large proportion of fibre, which has not only been made into ropes and cordage, but also into sewing thread and beautiful white linen-like cloth of superior quality. The fibre, he adds, is easily separated from

other parts of the stalk, without their undergoing the processes of watering and bleaching, although by such the labor necessary for that purpose is considerably lessened. Like those of many other common plants, the superior merits of this generally accounted troublesome weed have hitherto been much overlooked—quoted by Wilson in Rural Cyc. It is stated that the roots possess astringent and diuretic properties, and have been found serviceable in poultices for tumors and decoctions for other complaints. The leaves, chopped up with meal or with boiled potatoes, are used for feeding ducklings, young turkeys and full grown poultry, especially in winter, and are said to promote the laying of eggs. Nettles are sometimes boiled and eaten in the manner of greens. Laborers use the young tops of nettles as a pleasant, nourishing and mildly aperient potherb, either in soups or in accompaniment with salt beef or pork. Rural Cyc.

In China they use the Neilgherry Nettle called, also, "vegetable wool," *Urtica heterophylla*, in the manufacture of coarse, stiff fabrics. It possesses a bright stiffness like coarse mohair, and is capable of being dyed. The bark of the young wood steeped in water, renders easy the separation of the fibre. P. O. Rep. Agricult., 1867.

RAMIE, CHINA GRASS, (*Bœhmeria tenacissima*, *Bœhmeria nivea.*)

This, sometimes spoken of as a Mexican plant, is a native of China and Japan, and belongs to the Nettle family, (order *Urticaceæ*,) which has markedly strong fibres. It has been highly recommended as a substitute for Cotton, and successfully used in the manufacture of cambrics and other fine stuffs. No mention of it is made by Mérat, Griffith or other writers whom I have consulted.

Some years since a new substitute for cotton was thus referred to by a Paris correspondent: "Great excitement prevails in those manufacturing districts of France where cotton is most used, on account of the discovery of a substitute for it. This is the China grass or white *Urtica*, (nettle weed,) which may be cultivated cheaply in all parts of France. The experiments with this new textile fibre have been going on for a year or more under the direction of a competent committee appointed by the Chumber of Commerce of Rouen. And this committee,

with the weed, the raw fibre, and various specimens of woven and colored and uncolored clothes in hand, have shown to the Chamber, beyond all question, that the substitute is a genuine one in every point. They declare, without reservation, that none of the qualities of cotton are wanting."

I obtain the following from one of the journals of the day: "The Mexican plant, which is spoken of of late, as possibly a rival to the cotton plant, is slowly making itself known to the world of commerce. In New Orleans the Ramie fibre is beginning to become an article of trade, and a demand for the fibre is also springing up in the West. Of the merits of Ramie, it is stated to be as good as linen cambric or silk."

Another journal, (1868,) mentions that "at an agricultural fair recently held in Alabama, it was one of the special features of the exhibition. Its fibres are said to be much finer and stronger than the best flax; that they are as fine as sea island cotton, and that, after cleansing, they become very soft and white, and take colors as readily as the finest wool or silk. Several articles of clothing made from this fabric were exhibited at the fair referred to, and were particularly noticed for the strength and beauty of the material. Its cultivation has been successful on a number of plantations in Alabama.

"Since its introduction into the United States in March, 1867, the Ramie has excited much interest among European manufacturers. The supply from the East is entirely inadequate to fill the demand, and unequal to the fibre here produced in quality; they are, therefore, very desirous of seeing it successfully cultivated in some country where the yield will be large and regular. The soil and climate of the Southern States are particularly adapted for the cultivation of Ramie, which requires a loose, sandy soil and temperate climate. In any of the Cotton States Ramie can be harvested at least three times a year; each harvest or cutting will produce between nine and twelve hundred pounds, making an average annual crop of about three thousand pounds of crude unprepared fibre, worth at present in Europe ten cents specie per pound; in preparing the fibre for manufacturing purposes it loses about one-half, and increases in value to sixty-five cents per pound. The fibre, when prepared for the spinner, is beautifully white, soft and glossy, closely resembling floss silk in appearance; it is much stronger than the

best flax, and readily receives the most difficult dyes without injury to its strength or lustre."

Mr. F. T. Knapp, who has an extensive plantation of it in St. Bernard's Parish, La., thinks it best in its propagation: "To bed up the earth in beds of about five or six feet width, and to mat-lay the stalks, when mature, in two rows, a foot apart, and to save the roots for sale. The stalks are laid longitudinally, lapping one another part of the way, and, by having two rows, if some miss in one row, the probability is that others will come up in the other row, so as to make it continuous in the beds. When these plants come up and mature, the first growth reaching about two and a half feet, he will layer them down, and thus have the whole bed grow up thick and high, like that we have just described.

"Of the productiveness of the Ramie there can be no doubt, nor of its thorough security and safety in this climate and as far north as Tennessee. The fibre can be cleansed and prepared as readily as that of hemp or linen, and as it is equal to the latter in fineness, and far superior to it in lustre, almost equalling silk, there can be no doubt that it will soon take the lead of cotton in the world's market."

I obtain a recent account of the Cultivation, etc., of this plant:

The Ramie Plant.—The ramie, standing single, is inclined to make many side-shoots or laterals, which is especially the case the first season. As soon as it has been once or twice cut down, close to or rather about one inch under the ground, and the roots have become stronger, a large number of ratoons will sprout from the roots and bulbouns, and few or no side-shoots will show themselves. The shoots or ratoons from the roots will stand close and push each other up. These close standing shoots contain the best fibre; they are hollow, almost as much so as cane. As soon as the fibre has the proper strength the stem begins to color a little darker near the ground. The size which the plants reach in a certain time varies according to richness and kind of soil, as well as weather and mode of cultivation. As a general rule it may be said as soon as the stems have reached a little more than four feet, the fibre will be of good quality, but does not get hurt if left uncut till it reaches eight to ten feet in length.

Culture.—It cannot be too much recommended to have the

piece of land intended for the ramie deeply cultivated; subsoiled to fourteen inches would not be too deep, and this is the most laborious work in the whole cultivation. The first year weeds have to be cut out, but this will give but little trouble. The second year the plant will have so many ratoons that other plants will have no room to vegetate. From this time the cultivation will give very little trouble, except one plowing between the rows early in the spring and after each cutting, and manure over the fields during the winter season. The field ought to be laid off in pieces of about twenty rows in width, and a passage left for a cart or wagon. The rows ought to be about four feet apart, and the plants in the rows half that distance. When the field is ready for planting, a furrow is made every four feet, about three to four inches deep, and in these furrows the plants are placed, with little more care than negroes plant sweet potatoes. The furrows ought to be made so that the rain will not stand too long, yet all heavy washing ought to be prevented. Rooted plants as well as layers ought to be covered with earth nearly to the top; roots ought to be covered with earth two or three inches deep. In case some plants or roots should not grow, the vacancies should be filled as soon as possible, and always the best plants taken for this purpose, so as to get an even growing field. As soon as the plants have reached seven to eight inches in height, they should be topped (as in the nursery) to force out side-shoots. When these latter are grown to about five or six inches in length, the plant has a kind of bushy appearance; then the plant is hilled nearly to the top. It is now left to grow until it has reached nearly the height of three feet, when it is cut down even with the ground, or better, one inch below. The fibre of this first growth can be used, but is not perfect yet, because the roots and bulbs are not large enough, and there are as yet too many side-shoots.

A few days after this cutting, a great many ratoons will make their appearance on the surface. The whole work now consists in keeping out all weeds. The second growth will be, under similar circumstances, a great deal more rapid than the first was and can be cut when about four feet high; each growth will have fewer side-shoots and soon they will disappear altogether. The planting in the field ought to be done in the spring but can be continued until the beginning of September. Those

which are planted late should be covered in winter with straw or leaves, because they are too young and tender to resist severe frosts. Those planted early in spring and summer do not need any protection, as they will make roots eighteen to twenty-four inches deep. All refuse matter falling off in cleaning the fibre ought to be fed or cured and put in the barn for winter use. All the manure coming from the plant ought to be carefully gathered and put back on the field. In this way, such a field will give a rich return for many years without need of being replanted. The experience in regard to soil is yet limited, but it is certain that a rich sandy loam suits the plant very well. The plant can be grown so far north as the earth does not freeze more than four inches deep in winter. The best portions of this country will be the southern part of Texas, and the States of Louisiana, Mississippi, Alabama, Georgia, South Carolina and Florida.

Use of the Ramie.—The ramie is useful in two ways. It contains, first, a silk-like fibre of uncommon strength and fineness; and, second, the refuse furnishes an excellent food for stock, which in quantity compares favorably with clover. The fibre will not only replace the cotton, but is bound to be a strong rival to flax. In strength its fibre is nearest to silk, and as soon as there is a little more experience and intelligence brought into requisition, by the cultivation and manufacture of the textile, it will be found to be the best substitute for silk.

Suppose this plant to have none of this useful fibre, its cultivation would be of immense value as food for stock, in a great many portions of the South. Another most important point in introducing the ramie here, is its easy cultivation. The first year it requires no more work than sweet potatoes, and then the main work is in harvesting. The quantity of fibre will be more and the price double that of cotton.

In case a field should be plowed up after a series of years for some other purpose, then the roots and bulbs will make excellent food for hogs, or can be manufactured into a durable dye.

The fences have to be kept in good order, because if cows and hogs are once accustomed to it, they will break down a poor fence to get to it. During the winter cows can be turned into ramie fields, but hogs and horses should be kept out. So far

this plant has no destructive enemies. The so-called nettle worm makes its appearance some seasons, but never hurts the fibre; it is satisfied with the lower leaves of the plant, and is in this way harmless. Besides, if they were as destructive as the cotton worm they could not injure the crop very much, as each cutting is matured in a very short period of time.

The plants attain a height of twelve feet and grow very thickly together. I have examined specimens of the fibre which were several feet in length—white, glossy and fine. In the Patent Office Rep., 244, 1855, is an account of its value for manufacturing purposes, with a reference to Dr. J. F. Royle and Dr. Roxburgh's Treatises on the Oriental Fibres. Dr. Royle says that the China grass cloth is made from this plant and that the fibre has sold in England at from £80 to £120 a ton.

In an article in P. O. Rep. Agricult., 1867, it is stated that the *B. candicans* is also used. The plants have been raised in Washington from the seeds, which should be protected from the sun.

LOW NETTLE, (*Pitæa pumila*, Gray. *Urtica pumila*, L.) Grows in wet soils, vicinity of Charleston; Richland; Fla. Fl. Sept.

Griffith, Med. Bot., 572. This is quite smooth; is said to be an excellent application to inflamed parts, and to relieve the eruption caused by the *Rhus*. Griffith invites further investigation.

PELTITORY, (*Parietaria Pennsylvanica*, Muhl.) Growing in the upper districts of S. and N. C.; with *P. debilis*, Forst, and *P. Floridana*, Nutt, growing in Fla., should be examined for the possession of sulphur, as some species are said to contain more sulphur than any other plants. Planche, Journ. de Pharm. viii, 367; Griffith.

HEMP, (*Cannabis sativa.*) Ex. Nat. Cultivated in the upper districts.

The value of this plant for manufacturing purposes, for making ropes and cordage, is well known. It may become a most important question whether or not we can raise it in the Atlantic States with as much profit as in Kentucky, or to repay the labor bestowed upon it. I have not been able to ascertain whether the juice of the plant, as cultivated here, possesses the

intoxicating properties of the East India species, (*C. Indica,*) though it has been asserted that "water in which it is soaked becomes violently poisonous." See a paper in Patent Office Reports, 1848, p. 574, from the Louisville Journal, containing a full description of varieties, mode of production, and preparation of hemp. Count Chaptal says, in his Chemistry applied to Agriculture, that M. Proust had determined, after numerous experiments, that the stalk of hemp furnished the best charcoal for the manufacture of gunpowder—better than the willow. From the seeds is extracted an oil, generally employed by painters. The fine oil obtained from the seeds is peculiarly adapted for burning in chambers, as it is perfectly limpid, and possesses no smell. The Russians and Poles, even of the higher class, bruise or roast the seeds, mix them with salt, and eat them on bread. It expels vermin from plantations of cabbages if planted on the borders of fields; if planted with that vegetable, *no caterpillar will infest it.* Willich's Dom. Enc. The seeds may be sown in April or May, from two to three bushels per acre, either broadcast, and hoeing out the plants to a distance of sixteen or seventeen inches, or by the drill, at a distance of thirty inches. In the autumn the plants are pulled, the male plants first, and the female plants six or seven weeks afterward, when they have ripened their seed. Thus there are two harvests of the hemp crop. The male plants are readily known by their faded flowers, and yellowish color. They are then tied in small bundles and carried to the pool, where they are to be steeped. Hemp, like flax, poisons the water in which it is steeped. The same process is followed when the female plants are pulled; only these, before they are steeped, have their seeds beaten out.

The process of steeping commonly lasts four or five days, and is continued until the outside coat of the hemp readily separates. It is then carefully and evenly spread on some grass turf, where it remains for three or four weeks, being turned over about twice every week, by which the decomposition of the woody part of the stem is materially accelerated. It is next carried to the barn, where it is bruised by the brake, a machine constructed for the purpose; it is then bound up into bundles, and carried to market. (Low's Prac. Agr. p. 348.) There is a paper on a species of African hemp by Mr. A. Hunter,

(Trans. High. Soc. vol. iii, p. 87;) others on the cultivation of hemp in America, by Mr. W. Tonge, (Ann. of Agr. vol. xxiii, p. 1;) in Italy, (ibid. vol. xvi, p. 439, and vol. ii, p. 216,) and in Catalonia. (Ibid. vol. viii, p. 243.) It seems that 100 parts of Indian hemp-seed yield 20 to 25 per cent. of oil. (Com. Agr. Asiat. Soc. 1838, p. 69.) See flax.

Among our native substitutes for hemp are the *Apocynum cannabinum;* the Canada Golden Rod, (*Solidago canadensis*,) L., (*S. procera*, of Ell.;) the Sunflower (*Helianthus*) affords single filaments, which are said to be as thick and as strong as small packthread; also our *Æsclepias Syriaca*, *Urtica dioica* and *Yucca filamentosa* or bear-grass. See these plants. Elliott says that bear-grass possesses the strongest fibre of any vegetable whatsoever. Its roots are extensive, and bear transplanting. See Prep. of Hemp, Farmer's Encyc. See, also, files of the Kentucky Farmer. Paper is made of waste hemp, whitened. The seeds afford an oil, which, boiled in milk, is recommended against coughs, and is also said to be useful in incontinence of urine. In India an intoxicating liquor is made from the leaves, resembling opium in its effects.

HOP, (*Humulus lupulus*, L.) Grows in the mountains of South Carolina (Dr. McBride) and on the Mississippi, and generally cultivated in Southern States.

Ed. and Vav. Mat. Méd. 185; Chap. Therap. and Mat. Med. i, 348, and ii, 455; Eb. M. Med. ii, 55; U. S. Disp. 374; Big. Am. Med. Bot. ii, 163; Freake, Med. Phys. Journal, xiii, 432; Thompson's Lond. Disp. 200; Bigsby, Lond. Med. Repos. v, 97; Bryorly's Inaug. Diss. Phil. An. 1803; Ives in Silliman's Journal, ii, 302; Thornton's Fam. Herbal. 820. This plant is certainly possessed of some narcotic power. According to Dr. Latham, an infusion of it is a good substitute for laudanum. It is employed in doses of one and a half drachms in allaying the distressing symptoms of phthisis. It augments the secretions, removes pain and irritability, and induces sleep. Dr. Maton, Fell. Roy. Soc. Coll. Phys., says that large doses produce headache. It is thought to be a specific in removing asthmatic pains, without increasing the secretions. Mér. and de L. Dict. de M. Méd. iii, 544; Pliny, lib. xxi, c. 15; Flore Med. iv, 196. It is given with good effect as a stomachic, in inappetency and weakness of the digestive organs. Mat. Med. Indica. 120; Bull.

des. Sci. Med. xvi, 145; Journal des Sci. Med. xli, 376; Edinb. Journal, iv, 23; Diss. Medici de Humuli medici viribus medicis, Edinb. 1803; Bromelius, "Lupulogia," Stockholm, 1687; Obs. of Freake on the Hop, Lond. *Lupulin*, obtained from it, is said to diminish the force of the pulse. See Journal de Chim. Méd. ii, 527; Journal de Pharm. viii, 228 and 330. In the Supplem. to M. and de L. Dict. de M. Méd. 1846, a case is reported of a girl being poisoned by the hop. Rev. Scientifique, Mars, 1845; Journal de Pharm. Mars, 1842. Much use is made of the hop poultice in allaying pain, applied over the part. Its domestic value in preparing the liquor known as yeast is obvious, as well as for other purposes where fermentation is to be established in the manufacture of many alcoholic drinks and malt liquors. The medicinal properties of the hop are said to depend upon the *lupulin*, a peculiar resinous secretion contained in the glands, which is obtained by threshing and sifting the strobiles. By analysis it consists of volatile oil, bitter principle, or *lupulin*, resin, etc.; when administered internally, this has all the good effects of the hop; given in pill, in doses of six to ten grains, or in tincture in those of a half to one drachm; and it may also be added to poultices, ointments, etc. Ives' Experiments; Griffith, Med. Bot. 574. The tincture of *lupulin* is said to be preferable; dose, one to two fluid drachms. The uses of the hop pillow and the tincture of hops, as sedatives and mild narcotics, are well known; but for the medicinal application consult the various works on the Materia Medica.

The Patent Office Rep. 280, 1857, contains a very full treatise on the hop, condensed from various sources—an analysis of the plant, the best mode of cultivation, gathering, etc. As the raising of the hop is of great importance, I would refer cultivators to this article. It is said to be one of the very most exhausting among cultivated plants, both in respect to the organic and mineral constituents which it extracts from the soil; so that valleys containing the *debris* of the surrounding country, should be selected. See, also, Wilson's Rural Cyc., art. "Hop," "Beer," "Ale." His account of cultivation, diseases, etc., of the hop is full and instructive. The stem of the hop contains a fibre like hemp, which is used in making a strong white cloth in Sweden, though it requires long steeping to separate the fibre. The hop plant is rich in tannin, and has been used for

tanning: the ash yields 25. of potash, 15. of lime, magnesia, salt, etc. The suckers of the hop are said to form an agreeable vegetable for the table when dressed like asparagus. Honey-dew is frequent on hop plants from the perforations of the aphis. It is said to be very abundant on cotton plants.

An article also on the cultivation of the hop can be found in Patent Office Reports, 1854, p. 354.

I quote from the paper mentioned above as follows, as I consider information on this topic important:

The hop is a perennial plant of easy cultivation, and will grow in any part of the Western States. Its domestic uses are so obvious, that no farm or garden should be without one or more roots. It requires a rich, deep, mellow soil, with a dry, pervious, or rocky sub-soil. The exposure in a Northern climate should be toward the south, as on the slope of a hill, or in any well sheltered valley. It may be propagated by seeds, or by divisions of the roots; but it is more usual to plant the young shoots which rise from the bottom of the stems of old plants. These are laid down in the earth till they strike, when they are cut off and planted in a nursery bed. Care must be taken to have only one sort of hops in the same plat or field, in order that they may all ripen at the same time. The ground having been prepared for planting, it is divided by parallel lines six feet apart, and short sticks are inserted into the ground along the lines at seven feet distance from each other, and so as to alternate the rows, as is frequently done with fruit trees and other plants, in what is called the "*Quincunx* form." By this method every plant will be just seven feet from each of its neighbors, although the rows will be only six feet apart, and consequently about one-eighth of land will be actually saved, as indicated in the diagram below:

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At each stick a hole may be dug two feet square and two feet deep, and lightly filled with the earth dug out, mixed with a compost prepared with well rotted dung, lime and muck. Fresh dung should never be applied to hops. Three plants are next placed in the middle of this hole six inches asunder, forming an equilateral triangle. A watering with liquid manure will greatly

assist their taking root, and they will soon begin to show "vines." Sticks three or four feet long are then stuck in the middle of the three plants and the vines are tied to them with twine or bass, till they lay hold and twine around them. During their growth the ground should be well hoed and forked up around the roots, and some of the fine mould thrown around the stems. In favorable seasons a few hops may be picked from these young plants in autumn, but in general there is nothing the first year. Late in autumn the ground may be carefully dug with a spade, and the earth turned toward the plants, to remain during the winter. Early in spring the second year the hillocks around the plants should be opened, and the roots examined. The last year's shoots are then cut off within an inch of the main stem, and all the suckers quite close to it. The latter forms an agreeable vegetable for the table when dressed like asparagus. The earth is next pressed round the roots, and the parts covered so as to exclude the air. A pole about twelve feet long is then firmly stuck into the ground near the plants; to this the vines are led, and tied as they shoot, until they have taken hold of it. If by accident a vine leaves the pole it should be carefully brought back to it, and tied until it takes new hold.

Mr. J. J. Bennett, of New York, says: "The manner in which I cultivate hops is as follows: After plowing the ground intended for hops, I use about ten loads of leached ashes per acre for a top-dressing, after which it should be well harrowed. The rows should be eight feet apart and the hills seven feet apart. In setting, a line is used with marks indicating the distance between the hills. After the line is drawn, small sticks are set to each mark. Roots are to be cut, two joints on each piece, three pieces to the hill; cover about two inches. The ground may be planted with corn the first year, as the hops will not run until the second. It should be sown the first of May in drills three and one-half feet apart; sow with seed-drill. The first year corn may be raised; plant one foot from the teasel row. I weed them twice the first year; the second year they are to be cultivated and hoed twice. The first of August I cut such as are ripe, which will be known by the shedding of the blossoms. I cut at four different times, the stems to be about four inches long. They are to be spread on shelves about eight inches deep, one tier above another. There should be a good circulation of

air, that they may cure well. I paid for cultivating five acres forty-two dollars; paid for harvesting eighty-five dollars." See a full description of hops, mode of cultivation, preparations, adulterations, etc., in Johnson's Chemistry of Common Life, vol. ii, p. 36; also Ure's Dictionary of Arts and Manufactures, articles "Hop," "Ale," "Beer," etc. Consult Pereira's Mat. Medica, Chaptal's Chemistry applied to Agriculture, Boussingault's Treatise on Agriculture in its relations with Chemistry, and Thaër's Agriculture for mode of planting, preparation, etc. See, also, Phillips' History of Cultivated Vegetables.

The great importance of cultivating this plant on a large scale for manufacture of yeast should be impressed upon the people. The mode of making hop Beer is as follows: For a half barrel of beer, take half a pound of hops, and half a gallon of molasses. The latter must be poured by itself into the casks. Boil the hops, adding to them a teacupful of powdered ginger in about a pailful and a half of water; that is, a quantity sufficient to extract the virtue of the hops. When sufficiently brewed, put it up warm into the cask, shaking it well in order to mix it with the molasses. Then fill it up with water quite up to the bung, which must be left open, to allow it to work. You must be careful to keep it constantly filled up with water whenever it works over. When sufficiently worked it may be bottled, adding a spoonful of molasses to each bottle. Thornton's Southern Gardener.

Ale and beer can be made in the Southern States, though not with the same advantage as in colder climates. Though without practical experience, I am forced to the conviction that the desideratum is cool cellars. In the rural districts what are called dry cellars are constructed in the clay, just above the water-bearing stratum, the top enclosed or covered with a closed house. The temperature of these cellars is quite low, and they are used in keeping milk, butter, melons, cider, etc. I think their temperature would allow the manufacture and preservation of either wine, ale or beer. Ale has been made near Charleston, at Mount Pleasant; but to prevent fermentation, cellars are required. The reader interested in the subject can find a description of the English method of making malt liquors in Ure's Dictionary of Arts and Manufactures, in Wilson's Rural Cyclopœdia, (art. "Ale,") in Solly's Rural Chemistry, p. 178, see art.

"Fermentation and Distillation;" also Thornton's Family Herbal. "Mentha," p. 565, Child. on Brewing, and Combrune's Theory and Practice of Brewing. In England they use *Gentiana lutea*, *purpurea* and *rubra* as substitutes for hops. Consult this volume, art. "Persimmon," (*Diospyros*,) "Sassafras," (*Laurus*,) "Blackberry" and "Cherry," (*Cerasus*,) "Apple," (*Pyrus*,) for liquors.

MULBERRY, (*Morus alba*, L.) Nat. Diffused; vicinity of Charleston. Fl. March.

Bell's Pract. Dict. 319; U. S. Disp. 463; Dém. Élém. de Bot. The root is bitter and very astringent, and is useful in relaxed states of the bowels, diarrhœa, etc. Lind. Nat. Syst. Bot. 186. It contains *myroxylic* acid with lime. Turner, 640. See analysis in the Journal de Chim. Méd. x, 676. The bark is a purgative vermifuge, but is more important on account of "the leaves being the favorite food of the silk-worm." That this plant is easily cultivated in the Southern States may some day make it a source of great profit in the production of silk. The *mania* may again be revived, under auspices which may deprive the term of the slight suspicion of reproach which is attached to its objects. Mér. and de L. Dict. de M. Méd., Supplém. 1846, 496; Griffith, Med. Bot. 579.

As "this is the species upon which the *silk-worm* feeds," the following brief directions concerning the manufacture of Silk, from the Rural Cyc., may be useful; and as the production of the raw silk is in the power of almost any one, if the females of numerous families throughout the Southern States would devote their leisure to it, the aggregate amount of silk produced would contribute still further to render us independent as a people.

After the worm has enveloped itself in the cocoon, seven or eight days are allowed to elapse before the balls are gathered. The next process is to destroy the life of the chrysalides, which is done either by exposure to the sun, or by the heat of an oven, or of steam. The cocoons are next separated from the floss, or loose, downy substance which envelopes the compact balls, and are then ready to be reeled. For this purpose they are thrown into a boiler of hot water for the purpose of dissolving the gum, and being gently pressed with a brush, to which the threads adhere, the reeler is thus enabled to disengage them. The ends of four or more of the threads thus cleared are passed

through holes in an iron bar, after which two of these compound threads are twisted together, and made fast to the reel. The length of reeled silk obtained from a single cocoon varies from three hundred to six hundred yards; and it has been estimated that twelve pounds of cocoons, the produce of the labors of two thousand eight hundred worms, which have consumed one hundred and fifty-two pounds of mulberry leaves, give one pound of reeled silk, which may be converted into sixteen yards of *gros de Naples*. Those cocoons which have been perforated cannot be reeled, but must be spun on account of the breaks in the thread. The produce of these balls when worked is called *fleuret*. The raw silk, before it can be used in weaving, must be twisted or thrown, and may be converted into singles, tram, or organzine. The first is produced merely by twisting the raw silk to give more firmness to its texture. Tram is formed by twisting together, but not very closely, two or more threads of raw silk, and usually constitutes the weft or shoot of manufactured goods. Organzine is principally used in the warp, and is formed by twisting first each individual thread, and then two or more of the threads thus twisted, with the throwing-mill. The silk when thrown is called *hard silk*, and must be boiled in order to discharge the gum, which otherwise renders it harsh to the touch and unfit to receive the dye. After boiling about four hours in soaped water, it is washed in clear water to discharge the soap, and is seen to have acquired that glossiness and softness of texture which forms its principal characteristic. The yarn is now ready for weaving. Rural Cyc. I saw in Italy the manufacture of silk going on in most of the large towns, and many in the country prepare raw silk for the manufacturer and weaver.

The successful rearing of silk-worms, remarks Wilson, is a distinct art, and requires peculiar attention. They are subject to a variety of maladies. In many places it is usual to import the eggs from some district that has acquired reputation for their production. These are packed like grain, and are chosen in the same manner. The eggs are in many places hatched by the heat of the human body. The silk is contained in the form of a fluid resembling varnish, in long, cylindrical sacks many times the length of the animal, and capable of being unfolded by immersion in water. This fluid is easily forced out, and

advantage is sometimes taken of this circumstance to procure threads much coarser than usual, which are extremely strong and impervious to water. Rural Cyc. At the agricultural meetings in South Carolina and Georgia, articles of home-made silk are occasionally presented.

A correspondent from Sumter, S. C., furnishes the following:

"In South Carolina silk growing was successfully and profitably executed. The mother of the celebrated Pinckneys carried to England some silk produced on her plantation in South Carolina, and it was there woven into tissues, and the gowns made of it were presented by her to the mother of young George the Third, and to the Earl of Chesterfield. As early as the year 1660, the silk-worms of Virginia furnished the coronation robe of Charles the Second. The mulberry was indigenous in the colony, and the success of silk industry was fully established, until it yielded to the tobacco plant, very probably because the latter was found more profitable under the unskilled and careless labor of the imported Africans. In 1732, machinery, eggs and trees were introduced into Georgia; and in 1735, Queen Caroline, of England, wore on a great State occasion, a beautiful robe of Georgia silk. In 1749, that colony exported large quantities of cocoons, and one large silk establment erected in Savannah, received and used annually during the years 1758 to 1766, from ten to twenty thousand pounds of cocoons. The war withdrew the fostering care of the parent government, and reduced the demand for export, and the return of peace found the silk business suspended by cotton culture.

"In Cowdin's recent report to the Department of State, (Cowdin, U. S. Commissioner to Paris Exposition,) it is said that 'silk husbandry and manufacturing had almost ceased to exist in the United States at the commencement of this century.' Since then they have not kept pace with the advance in kindred pursuits. Nevertheless, they have always been prosecuted to an encouraging extent in various parts of New England, New York, New Jersey and Pennsylvania. As, for example, Mansfield, already referred to, has done a large business in sewing silks, and produced in 1839 five tons of the raw material. Washington, Penn., always kept up the business. It was introduced into the State Prison, at Auburn, N. Y., in 1841; and, the

first year, the product of sewing silk was about $13,000. It was steadily increasing in the country when, some twenty-five years ago, its growth was checked by a disastrous speculative furor in the *Morus multicaulis* shrub, which, for a few years, raged throughout the Union like an epidemic.

"The reaction fell heavily upon the whole business, covering it temporarily with odium and ridicule. It has since been slowly recovering from this season of delusion and folly.

"In 1840, the product of silk raised in the United States was estimated at about sixty thousand pounds, valued at $250,000. In 1844, it had increased to about four hundred thousand pounds, worth $1,500,000. By the census of 1860, when the effects of the speculative mania alluded to had culminated, the annual product was reported at only fourteen thousand seven hundred and sixty-three pounds. Then it began to revive; and by the census report of 1860, it appears that the manufacture of sewing silks was carried on extensively in Connecticut, New Jersey, Massachusetts, Pennsylvania and New York—the States being named in the order of the value of their products. The annual production in these States, including tram, organzine, etc., was placed at upwards of $5,000,000. Ribbons were made to a small extent, as were also silk stuffs. But, aside from sewing silks, the chief silk manufacture consisted of ladies' dress trimmings, coach laces, etc., of which the cities of Philadelphia and New York are reported as producing about $2,300,000.

"Since 1860, the business in all its departments has made steady progress; and the current period is more favorable than any previous one for its energetic prosecution. Our country is specially fitted for silk culture. The experiments in Georgia and South Carolina proved that their soil and climate were peculiarly suited to it. May we not hope that after the lapse of eighty-five years it will be resumed."

From an Essay on the Culture and Manufacture of Silk. By H. P. Byram, Brandenburg, Meade County, Ky.—Experience of past ages has fully proved that the climate of the United States is as well adapted to the nature and habits of the silk-worm and the production of silk, as that of any other country. Several varieties of the mulberry are indigenous in our soil, and those generally used in the native country of the silk-worm succeed equally well in our own soil and climate. Hence, from

the nature and habits of American people, we must soon become the greatest silk growing nation on the earth. The first step toward the production of silk is to secure a supply of suitable food for the silk-worm.

Having tried all the varieties introduced into our country, I find the *Morus multicaulis* and the Canton varieties, all things considered, most suitable for that purpose.

Propagation of the Mulberry.—Although the experience of some years past has rendered this subject familiar to many, yet those now most likely to engage in the *legitimate* business of silk growing may be less acquainted with the propagation of the tree. I shall give some brief directions on the subject:

Almost any soil that is high and dry, and that will mature Indian corn, is suitable for the mulberry. That, however, which is inclined to be light or sandy is the best.

The *Morus multicaulis* may be propagated by cuttings or layers, (or a good variety may be raised from the seed.) Cuttings may be of one or more buds, planted perpendicularly in a light, mellow bed of good soil. They should be planted when the spring has fully opened, or about the usual time of planting corn. They may be planted in the rows, about twelve inches apart, and the rows at a sufficient distance to admit of thorough cultivation with a plow or cultivator. The ground should be kept mellow until past midsummer. Select a suitable piece of ground for a permanent orchard. It would be well if broken up in the fall, and again plowed in the spring, and, if followed with the sub-soil plow, it would be advantageous. After a thorough harrowing it should be laid off in rows, each way *eight* feet by *four*, with the plow. The trees at one year old from the nursery should be taken up, the tops cut off near the roots, and one planted in each of the squares or hills. Having tried various methods of planting and different distances, I prefer those here given, This will admit the free use of the plow and cultivator *both ways.*

In latitudes north of 38° or 40°, where land is dear, they may be planted much nearer. If a sufficient quantity of cuttings from old trees cannot at once be procured, the trees from the nursery should be taken up in the fall and buried in a cellar, or upon the *north side* of a bank or hill, in alternate layers of trees and earth, and the whole protected by a shed from the rains of

winter, as the plants seldom sufficiently mature the first season from the cuttings to withstand the winters of a Northern climate, particularly that portion above the ground. South of 38° of latitude these precautions may not be necessary.

The Canton mulberry is a more hardy kind, resembling in some degree the varieties known as the common Italian, producing a large, full, thick leaf. This variety is propagated from seed and from layers, but does not readily strike root from cuttings. In 1838 I procured a quantity of this seed from Canton, which produced a *variety* of plants. Those producing the greatest quantity of fruit yield an inferior leaf. They are now propagating this variety very extensively at the silk growing establishment at Economy, Pennsylvania, which, in connection with the *Morus multicaulis*, constitute the principal food used at this establishment.

The fruit should be gathered when fully ripe, and the seed washed out and dried. If south of the 39th parallel of latitude, they may be planted the same season. North of this, they should be planted in the following spring, in a bed of rich earth prepared as for beets or onions, and planted in drills about *eighteen inches* apart. The young plants should be thinned to the distance of from *one* to *three* inches from each other. They should be well cultivated, when they will attain the height of three or four feet the first season. In the fall, in a Northern climate, the young trees should be taken up and protected during the winter, as directed for the *Morus multicaulis*. [This is not necessary in the Southern States.]

In the following spring the branches may be taken off *near* the main stem, the top shortened, and the whole tree planted, completely covering the roots and main stem from one to two inches deep. In this way two or more trees may be produced from each plant. If a full supply can be procured, the *roots* of the young plants may at once be removed to the orchard. They may be allowed to stand much nearer than the *multicaulis*, leaving only sufficient room for cultivation. When seed is required it would be well to plant out a portion from the seed-bed at once, as standards for this purpose, always selecting those bearing *full heart-shaped* leaves. The leaves of the white Italian produces a good, heavy cocoon, and should always be used in the last age of the worms when other larger-leaved varieties cannot be obtained.

Cultivation.—The mulberry orchard should be *annually* cultivated. The ground kept mellow and free from weeds until the middle of July. The fields should be divided into three equal parts, and after the second season from planting, one-third each year should be cut down near the ground. This will cause a more vigorous growth, and an abundant crop of foliage.

Feeding apartments.—Various plans have been proposed and adopted for cocooneries, or feeding-sheds, for the silk-worms, none of which, I think, are without objection, except a perfect laboratory, so constructed as to be able to fully control the atmosphere and temperature within. This, however, would be too expensive, and require too much skill and judgment for general adoption. Open or shed-feeding has been employed with success of late years, and for general use may be the most successful for family establishments. This, however, confines the whole business, particularly in the Northern States, to one or two crops in the season. South of Ohio more can be successfully fed.

These sheds may be cheaply made by setting some durable posts in the ground, say from six to eight feet high, with a roof of shingles or boards. The roof should project two feet over the sides. There should be some temporary protection to the ends and sides of the shed; perhaps the best and cheapest can be made of strong cotton cloth, (Osnaburg;) three or four widths should be sewed together, with small rods across the bottom, which will answer as weights, and also as rollers, which, by the aid of a pulley, may be rolled or let down at pleasure. The width of the sheds must be governed by the size of the hurdles or feeding-trays used. The width that I have adopted is from eighteen to twenty feet. The length according to the extent of the feeding contemplated.

Where it is designed to carry on an extensive business, a building should be constructed expressly for the purpose. It should be on an elevated situation, convenient to the mulberry orchard. There should be a cellar under the building. Any material commonly used for building may be employed. If of wood, weather-boarded and plastered. It would be well to fill up the space between the two with tan-bark or unburnt brick, or something of the kind, which will render the temperature more uniform. The width of the building should be twenty or twenty-eight feet—the former admitting of two, and the latter

of *three double ranges* of hurdles or trays of suitable size; the length suited to the extent of the business designed. It should be two stories high, and so constructed as to be thoroughly ventilated. There should be two double doors in each end, with doors, windows and ventilators in the sides. The windows should extend to near the tops of the rooms. There should be sliding ventilators near the floor. The windows may be filled with oiled paper or cloth, which will admit the light and exclude the sun. It would also be important to have under each tier of hurdles, through the floor, two planks of ten inches width each, hung with hinges, that they may be raised at pleasure by a pulley. Also an upright ventilator on the roof, fitted with blinds, through which a constant draft may be kept up.

In one end of the building, in *each* of the two doors, there should be a ventilating wheel made of thin boards (plank) much after the form of the wheels applied to the sterns of our steam-propellers. These wheels should be about two feet in diameter. They should be put in motion for a few minutes every hour, or oftener in still weather. Both may be made to turn by one crank, connecting each by bands and whirls to the main shaft.

An air-furnace, such as is now employed in heating churches and other buildings, should be constructed in the cellar, and so arranged as to draw from the feeding-rooms all the air necessary to supply the furnace. The air, when heated in the chamber, should be conveyed through the whole length of the rooms, in a square pipe with openings at short distances from each other, which should increase in size as they recede from the furnace. These openings may be so connected as to be all closed at once, or a valve applied at the air-chamber may be used to cut off the communication of heated air when the temperature is sufficiently high in the rooms, suffering the hot air to escape outside of the building. In the last ages of the worms the furnace will be found of great benefit, even when the heat is not required in the rooms, for the purpose of drawing off and consuming the impure air of the cocoonery.

At Economy, they not only make use of air-furnaces, but in an adjoining building they have a large air-pump constantly in operation, connected with the cocoonery by a pipe with small

openings through the length of the building. This pump is kept in motion by a steam engine.

With good eggs, when proper means have been employed for their preservation, and the feeding apartments thoroughly ventilated, I do not know of a single instance where the worms have proved unhealthy. From the conviction that proper regard had not generally been paid to the ventilation of cocooneries, in the summer of 1842 I commenced a series of experiments, by which I ascertained that the silk-worm during its last age consumed nearly its own weight of leaves daily; and that the amount of exhalations or imperceptible perspiration given off in *proportion* to the quantity of food consumed, was about equal to that ascertained to escape from a healthy man.

I found from the most careful experiments, that the weight of one hundred thousand silk-worms, about five days before their time of winding, was four hundred and fifty-eight pounds, and that they would consume daily three hundred and seventy-two pounds of leaves,* and that their increased weight in twenty-four hours from the food consumed was forty-six pounds, and that the enormous amount of two hundred and six pounds was given off in the same time, in the form of exhalations or imperceptible perspiration alone. This, then, I think, fully explains the cause of disease complained of by many, and estabtablishes the importance of ventilation in every possible form.

In one corner of the building there should be a hatching-room, with which the furnace below should be connected, so as to receive a greater or lesser degree of heat, as may be required, without reference to the temperature of the feeding-rooms.

Fixtures.—In fitting up the hurdles or feeding shelves for a building of twenty feet wide, it will require a double range of posts, two and a half or three inches square, on each side of the centre of the room, running lengthwise, and the length of the shelves apart in the ranges, and each two corresponding posts, crosswise of the ranges, about the width of the two shelves apart. On each double range across the posts are nailed strips, one inch or more in width and about fifteen inches

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* Had these worms been fed in the ordinary manner they would have consumed many more leaves in the same time. But to preserve the greatest possible accuracy, through the whole experiment they were fed rather sparingly.

apart, on which the trays or hurdles rest, which may be drawn out or slid in as may be found necessary in feeding. The aisles or passages of a building of the above width will be four feet each, allowing two feet for the width of each *single* hurdle.

The hurdles that I have used for many years are of twine net-work. A frame is first made five feet long and two feet wide, of boards seven-eighths of an inch thick, and one and a half inches wide. There should be two braces across the frame at equal distances of five-eighths by seven-eighths of an inch square. On a line, about half an inch from the inner edge of the frame, are driven tacks *nearly* down to their heads, at such distances as will make the meshes of the net about three-quarters of an inch square. Good hemp or flax twine is passed around these tacks, forming a net by passing the filling *double* over and under the warp, or that part of the twine that runs lengthwise. This twine should be somewhat smaller than that running lengthwise. On a damp day the twine becomes tight; I then give the netting two good coats of shellac varnish. This cements the whole together and renders it firm and durable. The varnish is made by dissolving a quantity of gum shellac in alcohol in a tin covered vessel, and placed near the fire. It should be reduced, when used, to the consistency of paint.

Another set of frames is made in the same way and of the same size, and covered with strong cotton or tow cloth; this is secured with small tacks. Upon these the net frames rest, which serve to catch the litter that falls through from the worms. Hurdles made and supported in this manner admit of a more free circulation of air, and the litter is less liable to mould or ferment, and can be removed and cleaned at pleasure. With this kind of hurdle and screen I make use of winding-frames, constructed in the following manner: a light frame is made of boards one and a half inches wide, and the length of the hurdles, and two feet and four inches wide; this is filled crosswise with thin laths about one inch apart in the clear. The manner of using these will be hereafter explained. They answer the twofold purpose of winding-frames and mounting-ladders.

The care and expense required in fitting up a house on this plan may prevent its general adoption. The most common method that has been heretofore employed is permanent shelves; but the labor required to keep the worms properly cleaned renders this plan objectionable.

At Economy, Penn., the rearing of the silk-worm is now carried on to a great extent, and more successfully than in any other part of the United States, or perhaps the world. Their houses are two stories high. The worms are fed on small trays about eighteen or twenty inches wide, and about three feet long. They are supported in the same manner as the hurdles above described, and are about six inches apart. When the worms are about ready to wind, they are transferred to the upper story, to permanent shelves about sixteen inches apart, where they form their cocoons in bunches of straw placed upright between the shelves. The worms are cleaned at least once after every moulting, and after the last, every day. For this purpose they have nets woven or knit of cotton twine, something larger than the size of the trays, with meshes of various sizes suited to the age of the worms. For the last age they are about three-quarters of an inch square. They are used without frames. When it is required to remove the worms from their litter, the nets are laid lightly over them, and then plentifully fed. When the worms have arisen upon the fresh leaves, they are removed by two persons taking hold of the four corners of the net and transferring them to clean trays, held and carried off by a third person. One hundred thousand are changed in this manner in two hours.

Description of the Silk-worm.—It will be necessary for the inexperienced culturist to have some knowledge of the forms, changes and appearances of the silk-worm before he enters upon the duties of his interesting charge. The silk-worm is a species of caterpillar, whose life is one continual succession of changes, which in due time becomes a moth or winged insect, like others of the genus. The time occupied in going through its different forms of existence varies in different countries—governed by climate, temperature and the quality and quantity of the food upon which it is fed, and the nature of the particular variety of the insect.

The worm changes or casts its skin (of the common varieties) four times before it attains its full growth. These changes are called moultings, and the periods intervening between the several moultings are termed ages. When it is first hatched it is of a blackish color, which afterward becomes lighter, varying almost daily to different shades, and in different varieties through every age, to the close of the last, or near the time of

spinning, when it assumes a grayish yellow, semi-transparent appearance.

Having tried all the varieties that have been introduced into the United States, those I consider the best are known as the *Chinese Imperial*, producing a large, salmon-colored, peanut-shaped cocoon; and a kind called the Peanut, producing a mixture of white and salmon-colored cocoons. This variety produces a larger and more firm cocoon than any of that name that I have seen.

Time of hatching.—Rearing.—When the leaves of the mulberry have put forth to the size of about an inch in diameter, it may be generally inferred that the proper time for hatching the worm has arrived. The papers or cloths containing the eggs should then be brought out and placed in the hatching-room, upon a table or trays made for the purpose. When artificial means are employed, the temperature should be *gradually* raised until the time of hatching, which will be in about ten days, to 75° or 80° of Fahrenheit's thermometer. But few worms will make their appearance on the first day, but on the second and third the most will come out; should there be a few remaining on the fourth day, they may be thrown away, as they do not always produce strong and healthy worms. When the worms begin to make their appearance, young mulberry leaves cut into narrow strips should be laid over them, to which they will readily attach themselves; these should be carefully removed, and placed *compactly* upon a cloth screen or tray prepared for them, and other leaves placed upon the eggs for the worms that still remain, which should be passed off as before. A singular fact will be observed, that all the worms will hatch between sunrise and before noon of each day. Care should be taken to keep the worms of each day's hatching by themselves, as it is of the greatest importance to have the moultings and changes of all the worms as simultaneous as possible. It is also important that the worms that have been transferred to the trays should *not* be fed until the hatching for the day is completed, so that all may be fed equally. Young and tender leaves should be selected to feed the worms with; these should be cut with a sharp knife into pieces not exceeding a quarter of an inch square, and evenly sifted over them. They should be fed in this way six or eight times in twenty-four hours, as nearly as possible at regular and stated periods.

It will be impossible to lay down any definite rules for the quantity of leaves necessary for a given number of worms for each succeeding day through every age. After a little acquaintance with their nature and habits, the intelligence and judgment of the attendant will be the best guide; they should, however, have as much as they will eat, but after a few days care should be taken not to give them more than they will generally consume, as this will increase the accumulation of litter, which will endanger the health of the worms. In the last age they eat voraciously, when they should be well supplied. A quantity of leaves should always be on hand in case of wet weather.

When the average range of the thermometer is between 70° and 80° the several moultings will take place near the fifth, ninth, fifteenth and twenty-second days after hatching. It may be known when the worms are about to cast their skins, as they cease to eat, and remain stationary, with their heads raised, and occasionally shaking them. This operation will be more distinctly observed as they increase in size through their succeeding ages. Assuming the above temperature as the standard, the quantity of leaves for the first three days of this (the first) age must be gradually increased at each feeding, after which they will require less at each succeeding meal until the time of moulting arrives, when for about twenty-four hours they eat nothing. But as it is seldom the case that all cast their skins at one and the same time, some will still be disposed to eat, when a few leaves must be *cut fine* and *sparingly* scattered over them, so that those that remain torpid may be disturbed as little as possible. They must now be carefully fed in this way until it is discovered that some have moulted, when the feeding must cease altogether until the most of them have recovered. This rule must me particularly regarded through all the succeeding moultings, otherwise some of the worms will be far in advance of others; and this want of uniformity will increase throughout each succeeding age, and to the period of winding, which will not only result in great inconvenience in gathering the cocoons, but will materially injure the worms, and consequently lessen the crop of silk.

When the *greatest portion* of the worms have moulted, and appear active, leaves a little wilted are laid over them, by which they are passed to clean trays. If any still remain that have moulted, they must be transferred in the same manner, by

laying more leaves upon them. The remnant of worms that have not changed their skins should be left upon the litter and added to those of the next day's moulting. By closely regarding these rules throughout the several ages, the worms will generally all commence the formation of their cocoons about the same period.

After having gone through and furnished all the worms with a quantity of leaves, it is well to go over a second time, and add more where they seem to require it. Very young and tender leaves must be given to the worms in the first age, after which older ones can be given as they advance in age until after the last moulting, when they should be fed upon sound, full-grown leaves. After the second moulting the leaves, where large crops are fed, may be cut by running them twice through a common *rotary* hay or straw-cutter, of Hovey's, or one of a similar make.

The worms will frequently heap together and become too thick, as they increase in size. When they are fed the leaves must be spread, and the space enlarged, or they may be removed by leaves or twigs of the mulberry to places unoccupied. If they are permitted to be crowded, disease is apt to follow and the whole crop is endangered. It will sometimes be observed, when the light falls more directly on one side of the hurdle than the other, that the worms will incline to leave that side and become crowded on the opposite, when the hurdle should be turned around.

Up to the last moulting it is best to feed the worms entirely upon the leaves of the *multicaulis*, after which the Canton or white Italian should be used if a full supply can be obtained—the former being consumed with greater avidity, and the accumulation of litter is consequently less. The Canton and Italian produce the heaviest cocoon, while the *multicaulis* yields a finer and stronger fibre. In pursuing this course the advantages of both are in some degree secured.

The worms should be removed from their litter immediately after each moulting, and in their fourth age the hurdles should be cleaned a second time, and after the last moulting they should be removed at least every second day. Where nets are not used in the last ages, the worms are changed by laying over them the small branches of the mulberry. Recently branch-

feeding, as it is termed, has been introduced with some success, and with great economy of time; in the last ages of the worms care should be taken to lay the branches as evenly as possible, especially where it is designed to use the twine hurdles, otherwise it will be difficult for the worms to ascend through the netting.

When the worms are about to spin they present something of a yellowish appearance; they refuse to eat, and wander about in pursuit of a hiding-place, and throw out fibres of silk upon the leaves. The hurdles should now be thoroughly cleaned for the last time, and something prepared for them to form their cocoons in. Various plans have been proposed for this purpose. The lath frames, before described, I prefer. They are used by resting the back edge of the frame upon the hurdle, where the two meet in the double range, and raising the front edge up to the underside of the hurdle above, which is held to its place by two small wire hooks attached to the edge of the hurdle. A covering of paper or cloth should be applied to the lath frames. In using the hurdles and screens I remove the screen from under the hurdle, turning the underside up, and letting it down directly upon the winding-frame. This affords double the room for the worms to wind in. Lath frames of this description have advantages that no other fixtures for winding possess that I have ever seen tried. The frame resting upon the backside of each hurdle renders this side more dark, which places the worms instinctively seek when they meet with the ends of the laths, and immediately ascend to convenient places for the formation of their cocoons. From these frames the cocoons are gathered with great facility and free from litter and dirt, and when they are required they are put up with great expedition.

Where branch-feeding has been adopted by some, no other accommodation has been provided for the winding of the worms than that afforded them by the branches from which they have fed. This is decidedly objectionable, as the worms are always disposed to rise until their course is obstructed above. When this is not the case they wander about for hours upon the tops of the branches, and only descend after their strength becomes exhausted, and the result is the production of a crop of loose, inferior cocoons. Next to lath frames, small bunches of straw afford the best accommodation for this purpose. Rye straw is

preferred. Take a small bunch, about the size of the little finger, and with some strong twine tie it firmly about half an inch from the butt of the straw; cut the bunch off about half an inch longer than the distance between the hurdles. They are thus placed upright with their butt-ends downward, with their tops spreading out, interlacing each other, and pressing against the hurdles above. They should be thickly set in double rows about sixteen inches apart across the hurdles. These may be preserved for a number of years.

After most of the worms have arisen, the few remaining may be removed to hurdles by themselves. In three or four days the cocoons may be gathered. While gathering, those designed for eggs should be selected. Those of firm and fine texture, with round, hard ends, are the best. The smaller cocoons most generally produce the male, and those larger and more full at the ends the female insect. Each healthy female moth will lay from four to six hundred eggs. But it is not always safe to calculate on one-half of the cocoons to produce female moths. Therefore, it is well to save an extra number to insure a supply of eggs.

The cocoons intended for eggs should be stripped of their floss or loose tow, which consists of irregular fibres, by which the worm attaches its work to whatever place it is about to form its cocoon. These should be placed on hurdles, in a thin layer, and in about two weeks the moths will come out; always in the forepart of the day, and generally before the sun is two hours high. If laid upon a net hurdle (which is best) they will immediately fall through the meshes and remain suspended on the underside where they are not liable to become entangled in the cocoons. As soon as the male finds the female they become united. They should be taken carefully by the wings, in pairs, and placed upon sheets of paper, to remain until near night, when the female will be anxious to lay her eggs. Then take each gently by the wings and separate them, placing the females at regular distances—about two inches from each other—upon sheets of paper or fine cotton or linen cloth; these should hang over a line, or be attached to the side of the house. In two or three nights the moths will complete their laying, when they should be removed from the papers or cloths. Frequently the males appear first in the greatest numbers, some of which

should be reserved each day in case there should afterward be an excess of females. They should be shut out from the light, otherwise they are liable to injure themselves by a constant fluttering of their wings. The female is largest, and seldom moves or flutters.

Killing the chrysalides.—After the cocoons have been gathered, those that are intended for sale or for future reeling should be submitted to some process by which the moths will be killed, otherwise they will perforate and spoil the cocoons. This is done by various methods. The most simple and convenient is to spread them thinly on boards, and expose them to the direct rays of the sun. In a hot day many of them will be killed in a few hours; but they must be stirred occasionally, or some will be liable to escape the heat, and afterward come out. At Economy, they place them in an air-tight box containing about ten bushels, (the box should always be full, or if not, a partition is fitted down to the cocoon,) sprinkling evenly through the whole, beginning at the bottom, about three ounces of camphor slightly moistened with alcohol, and finely pulverized. The box is then closed, and the seams of the top covered by pasting strips of paper over them. They remain in this way about three or four days. They are then spread out thinly in an upper loft to cure, where they should be occasionally stirred. It will require some weeks to thoroughly cure them. Before camphoring, the dead and bad cocoons must be taken out, otherwise they will spoil the good ones.

When it is convenient, it is best to reel as many of the cocoons as possible immediately after they are gathered, as they reel much more freely before they are exposed to the sun or dried.

Succession of crops.—Preservation of eggs.—Repeated attempts have been made to feed a succession of crops of worms throughout the entire season from the same stock of eggs. In most instances success has failed to attend these efforts. When proper means are employed, and due care observed, the eggs may be preserved, and worms successfully raised until the feed is destroyed by the frost. In many years experience I have never failed in this respect. In the spring of 1840 I communicated to Miss Rapp, of Economy, my method of preserving eggs, which she immediately adopted, and has pursued it until

the present time with perfect success, feeding from eighteen to twenty-five crops each year. The following is an extract of a letter from the Postmaster at Economy, dated January 19, 1843:

"Between May and September we raised near two millions of worms, in eighteen sets, of near equal numbers, about a week apart, producing three hundred and seventy-one bushels of cocoons. The last crop hatched the 9th of September, and spun the 10th of October. We found no difference in the health of the different sets. We are of the opinion that the late keeping of the eggs does not bring disease on the worms if they are kept right, and gradually brought forward as they ought to be."

It may be remarked that the qualities of the mulberry leaf are such in the latter part of the season that as heavy cocoons will not be produced as in the first. A bushel of the first crop raised at Economy, in the season referred to, produced twenty-three and a quarter ounces of reeled silk, and the last crop, wound in October, but nineteen ounces. About one month of the best part of that season of feeding was lost by the severe frost that occurred on the 5th of May, which entirely killed the young leaves, and must have materially injured the crop of the season.

My method of preserving eggs is to place them in the ice-house in February, or early in March, or sooner if the weather is warm. For this purpose a box or square trunk is made, extending from within one foot of the bottom of the ice to the top. This may be made in joints, so that as the ice settles the upper joints may be removed. The eggs should be placed in a tin box, and this enclosed in a wood one, and suspended in the trunk near the ice. The communication of warm air should be cut off by filling the opening with a bundle of straw or hay. The eggs should be aired for a few minutes as often as once in one or two weeks, always choosing a cool, dry morning; when selections for succeeding crops may be made these should be placed in another box, and gradually raised in the trunk for several days, avoiding a too sudden transition from the ice to the temperature of the hatching-room.

The ice-house at Economy is connected with the cellar, the bottom of the former being eighteen inches below that of the

latter. A long wooden box, extending into the ice-house, level with the bottom of the cellar floor, contains all the smaller boxes of eggs. The door of the box opening in the cellar is kept well closed to prevent the admission of warm air. They employ another ice-house, sunk deep in the cellar, with shelves gradually rising from the ice up to the top of the ground, upon which the eggs of succeeding crops are placed, and raised one shelf higher every day until they are taken into the hatching-room. The past season they have hatched about *five ounces* of eggs, or one hundred thousand worms every four days.

Diseases of the Silk-worm.—The silk-worm, like every other animal or insect, is liable to disease and premature death. European writers have enumerated and described six particular diseases to which it is subject. But in our more congenial climate nothing is wanting to insure a healthy stock of silk-worms and a profitable return from their labors, but to give them sufficient room, a regular and full supply of suitable food, a strict regard to cleanliness and a proper ventilation of their apartments. In excessively hot, damp or sultry weather, in the last age, the disease known as the *yellows* sometimes occurs. Where open feeding is adopted, some fine *air-slaked lime* may be sifted on the worms once or twice a day *before feeding*, and the diseased and dead worms picked out and thrown away. In a regular cocoonery, properly ventilated and supplied with an air-furnace, dry air should be made to circulate freely. But if the temperature is above 80° or 85° the ventilating apparatus should be constantly employed until a change of weather occurs or the disease disappears.

A feeding-house should be so arranged as to cut off all communication of rats and mice from the worms and the cocoons.

Reeling.—We have now arrived at another branch of the silk business, which more properly comes under the head of manufacturing. Every farmer who engages in the silk culture, in order to avail himself of an additional profit should provide his family with a suitable reel, by the use of which, after a little experience, he will be enabled to offer his silk in market in a form that will greatly enhance its value and much reduce the trouble and expense of transportation. Reels can now be procured in almost any of the principal cities at a small cost, or they can be made by any ingenious farmer or carpenter. The reel now uniformly used is that known as the Piedmontese.

All attempts to improve this reel in its general principles, I believe, have failed. At Economy, however, they have made an addition which may be found useful. It consists of two pairs of whirls, made of wire, in the form of an aspel to a reel, about four inches long, and two and a half inches across from arm to arm, making the circumference about six inches. These whirls are set in an iron frame, and run *each* upon two points or centres. Each pair is equidistant on a direct line, about eight inches apart, between the first guides and those on the traverse bar, instead of making the usual number of turns around each thread as they pass between the guides on the reel. With this arrangement each thread is taken from the basin and passed through the first guides, then carried over and around the two whirls, and where they pass each other on the top the turns are made necessary to give firmness to the thread, then passing directly through the guides in the traverse bar to the arms of the reel, making each thread in reeling independent of the other. This enables the reeler, when a remnant of cocoons are to be finished on leaving the work, to unite both threads into one, retaining the necessary size, whereas both would be too fine if continued on the reel in the ordinary manner.

Directions for Reeling.—In family establishments a common clay or iron furnace should be procured, to which should be fitted a sheet-iron top about twelve inches high, with a door on one side, and a small pipe on the opposite side to convey off the smoke. This top should retain the same bevel or flare as the furnace, so as to be about twenty inches in diameter at the top. The pan should be twenty inches square, and six inches deep, divided into four apartments, two of which should be one inch larger one way than the others. They should all communicate with each other at the bottom. In large filatures a small steam engine to propel the reels, etc., and to heat the water for reeling would be necessary.

Before the operation of reeling is commenced the cocoons must be stripped of their floss, and assorted into three separate parcels, according to quality or of different degrees of firmness. The double cocoons, or those formed by two or more worms spinning together, the fibres crossing each other, and rendering them difficult to reel, should be laid aside to be manufactured in a different manner.

After the cocoons have been assorted as above directed, the operation of reeling may be commenced. The basin should be nearly filled with the *softest* water, and kept at a proper heat by burning charcoal, or some other convenient method of keeping up a regular heat. The precise temperature cannot be ascertained until the reeling is commenced, owing to the different qualities of the cocoons. Those of the best quality will require a greater degree of heat than those of a more loose and open texture; hence the importance of assisting them. Cocoons also require less heat, and reel much better when done before the chrysalides are killed and the cocoons become dried.

The heat of the water may be raised to near the boiling point, (it should never be allowed to boil,) when two or three handsful of cocoons may be thrown into one of the large apartments of the basin, which must be gently pressed under water for a few minutes with a little brush made of broom-corn, with the ends shortened. The heat of the water will soon soften the gum of the silk, and thereby loosen the ends of the filaments; the reeler should then gently stir the cocoons with the brush until the loose fibres adhere to it; they are then separated from the brush, holding the filaments in the left hand, while the cocoons are carefully combed down between the fingers of the right hand as they are raised out of the water. This is continued until the floss or false ends are all drawn off, and the fine silk begins to appear; the fibres are then broken off, and laid over the edge of the basin. The floss is then cleared from the brush, and laid aside as refuse silk, and the operation continued until most of the ends are thus collected.

If the silk is designed for sewings, about twenty-five fibres should compose a thread; if intended for other fabrics, from eight to fifteen should be reeled together. The finest silks should always be reeled from the best cocoons. The cocoons composing the threads are taken up in a small tin skimmer made for the purpose, and passed from the large apartment of the basin to those directly under the guides. As the ends become broken they are passed back into the spare apartment, where they are again collected to be returned to the reel. The requisite number of fibres thus collected for two threads are passed each through the lower guides. They are then wound around each other two or three times, and each carried through

the two guides in the traverse bar, and then attached to the arms of the reel. The turning should now be commenced with a slow and steady motion until the threads run freely. While the reel is turning, the person attending the cocoons must continually be adding fresh ends as they may be required, not waiting until the number she began with is reduced, because the internal fibres are much finer than those composing the external layers. In adding new ends the reeler must attach them, by gently pressing them with a little turn between the thumb and finger, to the threads as they are running. As the silk is reeled off the chrysalides should be taken out of the basin, otherwise they obscure and thicken the water, and injure the color and lustre of the silk. When the water becomes discolored it should always be changed. If in reeling the silk leaves the cocoon in burrs or bunches, it is evident the water is too hot; or when the ends cannot be easily collected with the brush, or when found not to run freely, the water is too cold.

A pail of cold water should always be at hand, to be added to the basin as it may be required. When the cocoons yield their fibres freely, the reel may be turned with a quicker motion. The quicker the motion the smoother and better will be the silk. When from four to six ounces have been reeled, the aspel may be taken off that the silk may dry. The end should be fastened so as to be readily found. Squeeze the silk together and loosen it upon the bars, then on the opposite side tie it with a band of refuse silk or yarn, then slide it off the reel, double and again tie it near each extremity.

The quality of the silk depends much upon the art and skilful management of the reeler. All that is required to render one perfect in the art of reeling is a little *practice*, accompanied at the beginning with a degree of *patience*, and the exercise of *judgment* in keeping up the proper temperature of water, and the threads of a uniform size.

Manufacture of Perforated Cocoons.—The perforated and double cocoons can be manufactured into various fabrics, such as stockings, gloves, undershirts and the like. Before the cocoons can be spun they must be put into a clean bag made of some open cloth, and placed in a pot or kettle, and covered with soft water, with soap (hard or soft) added sufficient to make a strong suds, and boiled for about three or four hours. If they are required

to be very nice and white, the water may be changed and a small quantity more of soap added and again boiled for a few minutes. After they are boiled they may be hung up and drained; they should then be rinsed while in the bag, in fair water, and hung out to dry, without disturbing them in the bag. When completely dry they may be spun on the common flax-wheel by first taking the cocoon in the fingers and slightly loosening the fibres that become flattened down by boiling, and and then spinning off from the *pierced end.* The silk will run entirely off, leaving the shell bare. The double cocoons may be spun in the same manner, but should be boiled separately.

A species of edible mulberry is planted pretty generally for feeding hogs. I am informed that it continues to bear during several months, from April to July or August, and is considered highly advantageous. This is called the *Ever-bearing Mulberry.* The following account I obtain from the Southern Field and Fireside:

Ever-bearing Mulberries.—There are now three varieties of ever-bearing mulberries presented to us for selection or for gen, eral adoption. *Downing's Ever-bearing* is a seedling of the *multicaulis*, which it resembles in wood and foliage. It is, therefore, necessarily somewhat tender, and not suited to a more Northern climate. Mr. D. has given us an ample description of its fruit in his Fruit Trees of America, and merits much credit for originating so excellent a fruit.

Herbemont's or Hicks' Ever-bearing is a much hardier variety- and superior to the preceding in size and quality of its fruit, which is produced during a considerably larger period of time. It is a prodigious bearer; the berries are usually nearly two inches in length, sweet and delicious. At the South the fruit continues to ripen from the 25th of April until the 15th of August, and here at the North the crop extends to a late period in the autumn. This tree has dark red wood and indented leaves, very distinct from Downing's.

White Ever-bearing, sweet berries, partakes considerably of the character of the white Italian. It grows vigorously and yields immense quantities of fruit.

The first two varieties have been in fruit with us this season. Of Downing's, from a young tree, we gathered but a few berries, of which we preferred the more vinous and decided flavor

to that of the Hicks. The latter does not materially vary in quality from the common wild species, of which it is a variety, differing in its extended period of bearing. Our young tree, of about twice the age of Downing's, began to ripen the first of May, and has just stopped fruiting for the season. The fruit is worth growing on plantations for poultry and swine, as it is very prolific. A mulberry orchard of this kind would furnish the latter a full supply of food for about three months. It is to be found at all nurseries, and we venture to commend it to our agricultural friends as a valuable farm crop for the cheap rearing of good hogs.

The juice of the mulberry is used to give a dark tinge to confections. When properly fermented the fruit yields a pleasant vinous liquor, mulberry wine, and is mixed with apple juice to form mulberry cider. The bark of the root is a powerful cathartic. Farmers's Encyc.

COMMON MULBERRY, (*Morus rubra*, L.) Grows along rivers and swamps; vicinity of Charleston; Richland; Florida. N. C. Fl. March.

U. S. Disp. 463. The fruit is edible, laxative and cooling, and a grateful drink and syrups are made from it, adapted to febrile cases. The bark of the mulberry can be converted into cordage, ropes and brown paper. The inner bark of the root of the black mulberry, in doses of from half to a whole teaspoonful of the powder, is said to act as an excellent purgative. A syrup of the ripe fruit is an excellent laxative for children. A tincture of the inner bark of the root is considered a valuable laxative bitter.

Tartaric acid is obtained from the mulberry, the grape, currant, etc. It is almost always found in vegetables combined with potassa, with which it forms a nearly insoluble salt; it is the union which occasions it to be so easily precipitated from the liquors in which it is contained, especially when they ferment. The coats of tartar which are found deposited upon the sides of casks are a combination of tartaric acid, potassa and extracted matter. Chaptal. See Pereira, and treatises on chemistry for mode of formation of Cream of tartar.

Citric acid, also, is found in the skins of the red currant, of wild plums, cherries, strawberries and raspberries. In these it is found united with malic acid. The orange and lemon, of

course, furnish it in the largest proportion. The process adopted by Scheele for obtaining and crystallizing citric acid is to saturate the juice with lime, the insoluble salt, thus formed, being decomposed by sulphuric acid diluted with water. The liquor is then evaporated, and the acid obtained in a crystalline form. See Chaptal, Ure, works on Chemistry and Mat. Medica, Pereira, U. S. Dispensatory, etc.

The production of citric acids in the warmer portions of the Southern States is quite practicable, as the lemon grows abundantly. Citric acid supplies the place of lemon juice for domestic purposes, and in the arts, by its being freed from mucilage, which renders the juice liable to undergo speedy change, and from a diminution of its bulk by concentration. Chaptal.

To give a flavor to food, citric acid is preferable to vinegar, on account of the aromatic principle it contains. Dissolved in water, it forms a very wholesome drink; "about thirty grains of the acid, dissolved in a pint of water, and sweetened with sugar, composes an excellent lemonade." From its refreshing and anti-putrescent properties, it is invaluable during the hot months, and especially as an article for sea stores of vessels in warm latitudes, Chaptal; and particularly for the prevention of scurvy. "Citric acid is also particularly useful in the arts;" like oxalic acid, "it is employed in forming *reserves* in printed goods, and in removing spots of ink or rust." Chaptal. See, also, acetic acid, vinegar, etc., and Orange, "*Citrus*," in this volume.

Ell., in his Sketches of the Botany of S. C., says the wood is preferred, in the building of boats, to that of any other tree, except the red cedar, (*Juniperus Virginiana.*) The other woods suitable for ship-building found with us are, the live-oak for the timbers and knees, and the cypress, cedar, willow and several species of pine for the timbers as well as the spars—being preferred on account of their strength, lightness, or peculiarity of growth.

Wilson says of this tree that the wood is fine grained, compact, strong and solid, and by many persons is esteemed fully equal to the locust. It is employed in naval architecture at Philadelphia and Baltimore, for the upper and lower parts of the frame, for knees and floor timbers, and for tree-nails; it is hardly inferior to the locust, but is scarce in the ship-yards.

For posts it is considered nearly as lasting as the locust, but it grows more slowly, and requires a richer soil. From experiments made in France it was ascertained that the leaves were not as good for the silk-worm as those of the *M. alba*. A much less quantity was obtained than from worms fed on the white mulberry, and there was a greater mortality. Rural Cyc. See, also, my article in August number, 1861, of DeBow's Review.

Broussonetia papyrifera, the paper mulberry of our yards, belongs to this family, (Chapman.) Fustic is also got from the same family. As the paper mulberry is planted in this country, I will insert the account given by Wilson of its uses. The islanders of the Pacific make a kind of clothing from this tree, in the following manner: twigs of about an inch in diameter are cut and deprived of their bark, which is divided into strips, and left to macerate for some time in running water; after the epidermis has been scraped off, and while yet moist, the strips are laid out upon a plank in such a manner that they touch at their edges, and two or three layers of the same are placed upon them, taking care to preserve an equal thickness throughout. At the end of twenty-four hours the whole mass is adherent, when it is removed to a large flat, and perfectly smooth table, and is beaten with little wooden clubs till it has attained the requisite thickness. It is easily torn, and requires to be washed and beaten many times before it acquires its full suppleness and whiteness. The paper which is used in Japan, and many other countries in the East Indies, is made from this plant; for this purpose the annual shoots are cut off after the fall of the leaves, tied in bundles, and boiled in water mixed with ashes; after which the bark is stripped off by longitudinal incisions, and deprived of the brown epidermis. The bark of the more tender shoots furnishes a very white paper for writing. Hair pencils must be used in writing on this paper. Silk-worms eat the leaves of this tree also. Rural Cyc.

FIG, (*Ficus carica.*) Ex. Cult. Flourishes in South Carolina; Norfolk, Va. In the garden of Mr. T. Farr Capers, Charleston, the Fig trees are thirty feet in height and three in circumference. They are trimmed to the height of ten feet.

Shec. Flora Carol. The milky juice of many plants of the Family Moraceæ contains much caoutchouc. We have three native species growing in S. Fla. The fruit is well known; the

juice has been substituted for sympathetic ink, as the characters written with it are not visible till exposed to the sun. The decoction of the green branches and leaves imparts a deep gold color, of a brown shade, to cloth prepared with a solution of bismuth. I have heard it stated as a curious fact, that there is but one male fig in America, which grows in Louisiana! Some botanists describe the plant as containing both stamens and pistils within the fruit or pericarp.

Figs are excellent pabulum for *vinegar*, which may be constantly replenished with the over-ripened fruit.

The following easy process of making white vinegar from honey may not be amiss, even in a work of this kind, which professes to teach economical modes of becoming independent of foreign supplies. It is obtained from Wilson's Rural Cyc. The materials can be easily obtained. Four very good kinds of household vinegar, perfectly suitable for pickling, and for other domestic purposes, may easily be made from respectively—honey, brown sugar, British wines, and sour ale. First, as to honey or white vinegar: dissolve three-quarters of a pound of honey in rain water, and put it into a seven-gallon cask, with a quart of malt spirit; shake it well, then fill up the cask with rain water; shake it well, and keep near the kitchen fire, where it must stand without being moved or shaken. Let it remain five months in this place, and the vinegar will be made. Draw it off by piercing the lower part of the cask, and let it run till the concretion which is formed at the top, and is termed "mother of vinegar," begins to appear. You may then begin the process again without cleaning the cask. Properly toasted bread, saturated with yeast, would take the place of the malt spirit referred to above. See article "Vinegar," in Rural Cyc., for other methods.

The fruit is well known, and when properly prepared for market in the warmer portion of the Southern States, might constitutes an article both for export and for home consumption. Many persons believe implicitly in the power of the atmosphere about this tree to render meat tender. Our "Southern matrons" now put up this fruit in a most palatable shape for winter use, dried in the sun, after being boiled in a syrup. The celestial fig is the best for this purpose. Molasses can also be made from the fig and watermelon. Mr. C. H. Owen, of Charleston, made

it from the white fig. One peck yielded three pints. From a bushel he obtained seven quarts, according to the following directions:

"Wash the figs, then put them in a porcelain vessel; cover with pure water, boil carefully one hour. When cool, strain through a muslin cloth; then boil again until it is boiled down to a proper consistency, which you can easily tell by dipping up a spoonful and cooling. The above is all the preparation necessary. In boiling for the last time, take the scum off."

"F. J. S.," a correspondent of the Charleston Mercury, writes as follows on "our resources:" "You spoke, in the article above alluded to, of different coloring substances. The juice of the skin of our *blue fig* is abundant, and of a deep, brilliant red color; a half page written with it a few days since had the appearance of having been done with red ink. The *pomegranate*, which grows in great abundance in Southern Georgia, furnishes, in the rind of the fruit, a jet black fluid, which writes very smoothly, and retains its jetty hue. The metallic pen used may darken its color."

I have seen blue cakes resembling indigo, intended for dyeing and marked fig blue—probably extracted from the skins of the fig. Since the war the stems of the fig and titi (*Cliftonia*) have formed favorite materials for pipe stems. I have ascertained that the ashes of the leaves of the fig are useful in polishing metal-utensils, etc.

ULMACEÆ. (*The Elm Tribe.*)

SLIPPERY ELM, (*Ulmus fulva.*) I have observed it in Fairfield District. It is sometimes found in the lower districts; N. C.

Am. Herbal. 139; Frost's Elems. Mat. Med. and Therap. 228; U. S. Disp. 727; Dr. McDowell's Med. Exam. 244; West Jour. Med. and Phys. Sc.; Michaux, Fl. Americana, i, 172; and N. Am. Sylva, iii, 89; Griffith, Med. Bot. 563. A decoction of the bark was much used by the Indians in the cure of leprosy. It is an excellent demulcent employed as an emollient application, and internally is especially recommended in supression of urine, inflammation of the bladder, dysentery and diarrhœa. A decoction made of this, combined with the root of the sassafras, and guaiac, is esteemed as a valuable drink to increase cutaneous

transpiration, and to improve the tone of the digestive organs. Griffith considers it a good substitute for acacia, and he has witnessed its beneficial effects, externally applied, in obstinate cases of herpetic and syphilitic eruptions; he is inclined to ascribe higher curative powers to it than are generally admitted. It forms a good vehicle for enemata, where a mucilaginous fluid is required. The bark, cut in the form of a bougie, has been used in dilating sinuses and contractions of the urethra. The substance exuding from the bark is called *ulmin*. It could be largely collected for the use of soldiers—suitable wherever a highly mucilaginous substance is required. See Bené "*Sesamum*." This is the best wood we have for blocks, and is excellent for rails, as it splits easily, and is of long duration. It is more durable than the white elm.

I append the following to the second edition:

Dr. C. W. Wright, of Cincinnati, states (Western Lancet) that slippery elm bark has the property of preserving fatty substances from rancidity; a fact derived originally from the Indians who prepared bear's fat by melting it with the bark in the proportion of a drachm of the latter to a pound of the former, keeping them heated together for a few minutes, and then straining off the fat. Dr. Wright tried the same process with butter and lard and found them to remain perfectly sweet for a long time. (Am. J. Pharm. xxiv, 180,) U. S. Disp. 12th Ed. Dr. McDowel, of Virginia, used the bark for the dilatation of fistulas and strictures, (Med. Exam. i, 244,) and Dr. H. R. Storer, of Boston, subsequently for dilating the os uteri. (Bost. Med. and Surg. J. liii, 300.) See U. S. Disp.

WHITE ELM, (*Ulmus Americana*, Mx.) Vicinity of Charleston; N. C.

Mér. and de L. Dict. de M. Méd. vi, 799; Coxe, Am. Disp. 611; Phil. Med. Mus. 11. The *U. fulva* probably referred to.

The wood of the white elm, like that of the common European elm, is of a dark brown; and cut transversely, or obliquely to the longitudinal fibres, it exhibits the same numerous and fine undulations, but it splits more easily and has less compactness. It is, however, used at the North for the naves of coach-wheels, because it is difficult to procure the black gum. In Maine it is used for the keels of vessels. Its bark is said to be easily detached during eight months of the year; soaked in

water and suppled by pounding, it is used in the Northern States for the bottoms of common chairs. Michaux.

WAHOO, (*Ulmus alata*, Mx.) Rich soils; Florida; South and North Carolina.

The wood is fine grained, more compact, heavier and stronger than that of the American white elm. It is employed for coach-wheels, and is even preferred to the black gum, as being more hard and tough. Michaux. Farmer's Encyc.

The following statement has been published:

"*Wahoo Rope.*—We have seen a specimen of rope made of wahoo bark, by Mr. T. J. Howard, of this county. He has used the wahoo rope with great success in bagging cotton, and we can safely recommend his contrivance to the attention of planters. The common impression is that the bark is not in good condition, except in the spring of the year. This is a mistake. It can be used to great advantage at this season in bagging cotton. The manner of using the rope made of wahoo bark is altogether similar to that which has been in ordinary use."

SUGAR-BERRY; HACKBERRY, (*Celtis occidentalis*, L.) A noble tree, growing along the margin of streams and in damp lands; collected in St. John's; vicinity of Charleston; Newbern. Fl. June.

Mér. and de L. Dict. de M. Méd. ii, 170; Fl. Med. i, 90; Griffith, Med. Bot. 563. It yields a gum resembling that of the cherry tree; the root and leaves are somewhat aromatic, and were used by the Indians in syphilis. The berries have a sweet and pleasant taste.

The wood of this tree resembles closely, says Wilson, that of the *C. australis*. The timber of the latter is exceedingly durable, and was formerly employed by British coach-makers for making the frames of their vehicles; and by the Italian musical instrument-makers for making flutes and pipes. Rural Cyc.

MYRICACEÆ. (*The Gale Tribe.*)

Aromatic and sometimes astringent.

WAX MYRTLE; BAYBERRY, (*Myrica cerifera*, L.) Grows abundantly in the swamps of the lower country; Newbern. Fl. May.

Ell. Bot. Med. Notes, ii, 278; Matson's Veg. Pract. 198; U. S. Disp. 200; Pe. Mat. Med. and Therap, 786; Big. Am. Med. Bot. iii, 32; Am. Journal Med. Sci. ii, 313; Bergii, Mat. Med. ii, 541; Nicholson's Journal, iv, 187; Kalm's Travels, i, 129; Dana in Silliman's Journal 1; Thacher's U. S. Disp. 288; Mér. and de L. Dict. de M. Méd. iv, 531; De Cand. Essai, 772; Lind. Nat. Syst. Bot. 180. The root is a powerful astringent, and a decoction is employed in diarrhœa, dysentery, hemorrhage from the uterus, in dropsies which succeed fevers, and as a gargle in sore throat. It is also given to some extent by the vegetable practitioners. Griffith states (Med. Bot. 583) that the bark of the root is also stimulant and acrid, and in doses of a drachm causes a sensation of heat in the stomach, followed by vomiting and sometimes diuresis. The powder is an active errhine, and the leaves have some celebrity in domestic practice, as being anti-spasmodic, anti-scorbutic and astringent. Dr. Dana found the powdered root powerfully sternutatory. Bigelow says that the bark and leaves contain gallic acid, tannin, resin and a small quantity of mucilage. The berries afford a large amount of wax, which rises to the surface when they are boiled, not remarkable for adhesiveness or unctuosity. Dr. Bostock considers it a fixed, vegetable oil, rendered concrete by oxygen; and by the experiments of Dr. Dana, it constitutes one-third of the whole berry. It is employed for candles, emitting a fragrant odor, and it also forms the basis of a fine soap. It appears to possess some astringent and slightly narcotic properties, and has been administered by Dr. Fahnestock in an epidemic of typhoid dysentery. He gave it in doses of one to two drachms, and he is of opinion that its active principle resides in the green coloring matter. Am. Journal Med. Sci. ii, 313. Rafinesque states that a tincture of the berries, with heracleum, is beneficial in flatulent colic. De Cand., Essay upon the Louisiana Myrtle, (in French;) see Ann. de Chim. xliv, 141, and xlvi, 77; C. L. Cadet, Mem. on the Myrtle of Louisiana and Pennsylvania, Paris; Thiebault de Bernaud, Mém. sur le cirier, ou abre à cire, Paris, 1810. See my own experiments upon the applicability of the leaves as a substitute for oak bark, under "*Liquidambar*," sweet gum.

Dr. Wood, U. S. Disp., 12th Ed., says that a volatile oil might probably be collected from the leaves by distillation, and used

for similar purposes to those to which oil of pimento is applied. The powder of the bark has a peculiar aromatic odor and irritates the nostrils and throat when inhaled. It yields its virtues to water and alcohol. Chemically examined by Mr. G. M. Hambright it was found to contain volatile oil, starch, lignin, gum, albumen, extractive, a red coloring substance, tannic and gallic acids, an acrid resin soluble in alcohol and not in ether, and a peculiar acrid principle having acid properties, analagous to *saponin*, for which the name of *myricinic acid* is proposed. (Am. J. Pharm., May, 1863.) The Eclectics use the bark in diarrhœa, jaundice, scrofula, etc., and an alcoholic extract appropriately called *myricin*, is given in doses of about five grains. The dose of the powder is about thirty grains, of a decoction made with an ounce of the powdered bark to a pint of water; the dose is one or two fluid ounces. U. S. Disp.

"The northern nations formerly employed this plant in place of hops, and it is still in use for that purpose in some of the western isles; unless it is boiled a long time it is reported to occasion headache." Nicholson also says, in his Encyclopœdia, of the *M. cerifera*, that "it is used in tanning calf-skins; gathered in autumn, it will dye wool yellow, for which purpose it is used both in Sweden and in Wales; the Welsh lay branches of it upon and under their beds to keep off fleas and moths." Boussingault, in his Rural Chemistry applied to Agriculture, 1859, says of the wax-bearing myrtle: "The fruit yields as much as twenty-five per cent. of wax, and a single shrub will yield from twenty-four to thirty pounds of berries. The crude wax is green and brittle, and to be made into candles requires the addition of a certain quantity of grease." Proust discovered that vegetable wax formed part of the green fecula of many plants. In the common cabbage it occurs in large quantity. Oleine is said to predominate in the fluid vegetable oils. See, on this subject, Queen's Delight, (*Styllingia sebifera.*) The berries of the Pride of India (*Melia*) also yield an oil when dried and boiled. Wax has also been collected by scraping the stalk of the sugar-cane. See "*Sorghum*," in this volume.

I have repeatedly seen the wax produced from the myrtle in large amounts. The berries are boiled, and the wax rises on the surface of the water. The boiling should be continued a long time, and the berries stirred and bruised. The wax may

be remelted to purify it. Four pounds of this will make forty pounds of soap. The candles made of it are dark green in color. Candles and soap were made in considerable amounts during the war by those residing in the low country of South Carolina.

Wilson, in his Rural Cyc., quotes Hamilton, who says that the wax, after being skimmed off the water, should be strained through a coarse cloth to free it from foreign matter. When no more wax rises, the berries are removed with a skimmer and a fresh supply put into the same water, taking care to add boiling water to supply the place of that evaporated during the process. The wax should be dried, and melted again to free it from impurity. See Charles Louis Cader's Memoir, inserted in the Annales de Chimie, who said that the myrtle had been successfully cultivated near Berlin, and Hamilton recommends its cultivation in England for its wax-producing properties.

In F. S. Holmes' Southern Farmer, p. 236, is the following:

Large amount of Soap produced from Myrtle Wax.—I find the following recipe for making soap from myrtle wax (*Myrica cerifera*) in an old number of the Southern Agriculturist. As one of the complaints of soap-makers is the difficulty and expense of obtaining the grease, it will be well for us to avail ourselves of a production of nature, found abundantly in our lower country. The fruit is now matured, and may be had in abundance for the picking. I have seen very good candles made of myrtle wax. I trust our planters, residing in the vicinity of the myrtle, will profit by these advantages before the season for picking has passed:

"To three bushels and a half of common wood ashes add half a bushel of unslaked lime. This being well mixed together, put into a cask capable of containing sixty gallons and fill up with water. In forty-eight hours the lye will be strong enough to float an egg. Then draw off, and put from six to eight gallons of it into a copper kettle capable of containing twenty-five gallons. To this add only four pounds of myrtle wax. Keep constantly boiling for six hours. For the first three or four hours pour in occasionally a supply of strong lye, the whole frequently well stirred with a ladle. After six hours boiling, throw two quarts of common large grain salt into the kettle; leave one hour more to simmer over a slow fire. The liquor must be

placed in tubs to cool for twenty-four hours. Take out the soap, wipe it clean; put it to dry.

"The produce of this soap when it was weighed the next day was found to be forty-nine pounds of good, solid soap, from the materials and by the process above mentioned. At the end of six weeks the soap had only lost a few pounds from the evaporation of its watery particles.

"In many parts of our State the myrtle tree is abundant, and from three pecks to a bushel may be gathered from a hand per day."

There have been recent orders from the North for several thousand pounds of the wax, (1868.)

Since my examination and recommendation of the myrtle leaves as a tanniniferous agent, I see that it has been used by Mr. J. Commins, of Charleston, in tanning leather. He states that he used it extensively during the war and found it to answer all the purposes required.

I had observed, also, an unusual amount of astringency in the berries of the myrtle. The water in which they are boiled, with copperas, is used as a dye. I have seen an excellent dark brown obtained with very little copperas. If walnut leaves, bark, or the rind of the fruit is added the color is very black. I am informed in St. John's Berkeley, S. C., that a *blue* dye is obtained without a mordant, by using the same water repeatedly in boiling the berries for the extraction of the wax! This seems an unexpected result.

Myrica Carolinensis. Grows in dry soils; Richland; collected in St. John's; Newbern.

Griffith's Med. Bot. 583. Supposed to possess similar properties with the above. It can scarcely be distinguished from the others.

FERN BUSH; SWEET FERN, (*Comptonia asplenifolia*, Ait.) Mts. of North Carolina and northward. An aromatic astringent used by Barton and others as a pleasant drink in the summer complaints of children. Shoepf says on the authority of Colden, that chewing the root will check a spitting of blood, and that it is useful in rachitis and the debility following fevers. Griffith.

JUGLANDACEÆ. (*The Walnut Tribe.*)

BUTTERNUT; OIL-NUT, (*Juglans cinerea*, L.) Grows in the mountains of South and North Carolina. Fl. April.

U. S. Disp. 710; Archives Gén. 3e série, x, 399, and xi, 40; Frost's Elems. Mat. Med. 131. "The inner bark of the root affords one of the most mild and efficient laxatives we possess." The extract was a favorite remedy in General Marion's camp during the Revolutionary war. It is very efficacious in habitual constipation, in doses of ten to thirty grains; the first acting as a laxative, the maximum purging. Big. Am. Med Bot. ii, 115; Mx. N. Am. Sylva, 160; where it is spoken of as a mild cathartic, operating without pain or irritation, and resembling rhubarb in its property of evacuating without debilitating the alimentary canal. Dr. Rush employed it during the war. Wood says it is highly esteemed in dysentery; Lind. Nat. Syst. 181. The rind of the fruit and the skin of the kernel are extremely astringent, anthelmintic and cathartic; the oil extracted from the fruit is of a very drying nature. Mér. and de L. Dict. de M. Méd. iii, 687, (*J. cathartica.*) He remarks that the inner bark of the root is acrid and caustic, and purges, but occasions neither heat nor irritation; adapted to bilious constitutions and to dysentery; often combined with calomel. It is given to animals in a disease called "yellow water;" Bull. des Sci. Méd. Fér. xii, 338. To extract the cathartic principle, the bark is boiled in water for several hours; remove the extraneous matter and boil down the decoction to the consistence of honey or molasses—pills may be made of this. A syrup may also be made. The bark is strongest in the early summer. The powdered leaves are rubefacient, and act as a substitute for cantharides. Coxe, Am. Disp. 365. The bark of the branches affords a large quantity of soluble matter, chiefly of the extractive kind, water seeming to be a solvent. Wetherill found in it fixed oil, resin, saccharine matter, lime, potash, a peculiar principle, and tannin. Dr. B. S. Barton, in his Collections, 23, 32, thinks it is possessed of some anodyne property. Dr. Gray ascertained that four trees, eight to ten inches in diameter, produced in one day nine quarts of sap, from which was made one pound and a quarter of *sugar*, equal, if not superior to that produced from the maple. This plant is always given in the form of extract or decoction. Griffith's Med. Bot. 589; Thacher's Disp. 245; Rush's Med. Obs. i, 112; Pe. Mat. Med. and Therap. ii, 767; Lind. Med. Fl. 387. The wood of the butternut is used for the sleepers and posts of frame houses and barns, for posts and rail fences, troughs for cattle, etc. For corn-shovels and wooden dishes it

is preferred to the red flowering maples, because it is lighter and less liable to split; consequently, hollow-ware and other articles made of it sell at higher prices. In Vermont the wood is used for the panels of coaches and chaises, being well adapted for this purpose, not only for its lightness, but because it is not liable to split. It receives paint in a superior manner, its pores being very open, more so than poplar and basswood. Mx. Am. Sylva; Farmer's Encyc.

BLACK WALNUT, (*Juglans nigra*, L.) Diffused in lower and upper country of South and North Carolina; Newbern. Fl. June.

Mér. and de L. Dict. de M. Méd. iii, 687; Griffith, Med. Bot. vi, 89. The bark is styptic and acrid; the rind of the unripe fruit is said to remove ring-worms and tetter; and the decoction is given with success as a vermifuge. "A kind of bread is obtained from the fruit." In a communication received from J. Douglas, M. D., of Chester District, South Carolina, his correspondent, Mr. McKeown, informs me that a bit of lint, dipped in the oil of the walnut kernel and applied to an aching tooth, is an effectual palliative; he has employed it for thirty years with great satisfaction.

The following appeared in one of the journals during the year 1861:

Walnut leaves in the treatment of Diseases.—Dr. Negries, physician at Angiers, France, has published a statement of his success in the treatment of scrofulous disease in different forms by preparations of walnut leaves. He has tried walnut leaves for ten years, and of fifty six patients, afflicted in different forms, thirty-one were completely cured, and there were only four who appeared to have obtained no advantage. The infusion of the walnut tree leaves is made by cutting them and infusing a good pinch between the thumb and forefinger in half a pint of boiling water, and then sweetening it with sugar. To a grown person, M. Negries prescribed from two to three teacupsful of this daily. This medicine is a slightly aromatic bitter; its efficiency is nearly uniform in scrofulous disorders, and it is stated never to have caused any unpleasant effects. It augments the activity of the circulation and digestion, and to the functions imparts much energy. It is supposed to act upon the lymphatic system, as under its influence the muscles become firm, and the skin acquires a ruddier hue.

Dry leaves may be used throughout the winter, but a syrup made of green leaves is more aromatic. A salve made of a strong extract of the leaves mixed alone with clean lard and a few drops of the oil of bergamot is most excellent for sores. A strong decoction of the leaves is excellent for washing them. The salutary effects of this medicine do not appear on a sudden—no visible effect may be noticed for twenty days, but perseverance in it will effect a cure. As walnut tree leaves are abundant in America, and as the extract of them is not dangerous or unpleasant to use, and scrofula not uncommon, a trial of this simple medicine should be made. In directing attention to it good results may be expected.

A gray dye may be prepared with young, unripe walnuts. The walnuts should be beaten in a mortar, boiled with water—the yarn is previously prepared with lye water. See "*Rhus.*"

I obtain the following from a journal, (1862:)

To Dye Wool Yarn a Durable Black without Copperas.—Place in a kettle a layer of walnut leaves, then a layer of yarn, then a layer of leaves and another of yarn, and so on till the kettle is full; pour on water till all is covered, and boil all day. The next morning pour off the liquor into another vessel, and put fresh leaves with the yarn in layers as before, and pour the same liquor over it and boil again all day. Then hang the yarn in the air a few days, after which wash it and it will be a fine black.

The walnut leaves should be gathered in the autumn just as they begin to fall from the trees.

Both the black and white walnut possess a durable wood, and are secure from the annoyance of worms. The stem of the black walnut is easily perforated, and like the titi (*Cliftonia*) is much used for pipe-stems among the soldiers in camp. The fig is also used for the same purpose.

At a Convention of Gunsmiths, held at Atlanta, Ga., August 29, 1861, some facts were elicited which are interesting in this connection:

Mr. Hodgkins, a gunsmith, stated "that the greatest difficulty was to get wood for the stocks; that wood of one or two years was not sufficiently seasoned. It ought to be cut twenty years. The bark should be taken off the tree at once. Some thought it best to cut the timber in the summer, others in the

fall or winter." Gen. Wayne read the following from the Ordnance Manual:

"The most suitable season for felling timber is that in which vegetation is at rest, which is the case in midwinter or midsummer. Recent experiments incline to give the preference to the latter season—say the month of July; but the usual practice is to fell trees for timber between the first of December and the middle of March."

"Gen. Wayne, on being inquired of, gave it as his opinion that there was no artificial process of seasoning wood that would answer for making gunstocks.

"Mr. Esther said that maple timber could be seasoned rapidly by being boiled in oil. It prevented its cracking. It soon seasoned thoroughly, and would not spring.

"Mr. Lamb stated that walnut was the best for stocking guns, but harder to season. It required a great number of years—say twenty years, or nearly so. Maple was next, and persimmon the next. These could be seasoned by artificial process."

The reader will find some information on the felling of timber in Wilson's Rural Cyc. The fruit is edible, and pleasant to the taste. The wood is very compact and durable, with a black, fine grain, susceptible of a high polish, and forming a valuable substitute for mahogany, from which, when seasoned and varnished, it can scarcely be distinguished. It is much used in the South in the manufacture of tables, stair-railings and the inner work of houses. The writer has seen as beautiful book-cases, tables, stair-railings and cabinet-work made from the wood prepared on our Southern plantations, when well seasoned, as any imported from elsewhere. The roots, particularly those of old trees which have died, have a peculiarly rich black color, and are useful in making furniture and gunstocks.

The trunk of a walnut tree, tapped on the 11th February, yielded a sap containing some cane sugar. The saps of the sycamore, of the *Acer negundo*, and of the lilac tree, contained the same species of sugar; but that of the birch tree held in solution some grape sugar. In the sycamore and birch tree M. Biot observed an extremely interesting fact. He ascertained, on felling these trees, that the greater portion of the descending sap was accumulated toward the middle of the trunk. That of

the birch tree was acid and saccharine; the sap of that portion of the trunk which was buried in the ground contained no sugar, but a substance possessing the principal characters of gum. (Annales du Muséum d'Histoire Naturelle, t. ii.) It was probably an effect of the season, for Knight states that he never could discover the least trace of saccharine matter during winter in the alburnum either of the stem or of the roots of the sycamore. Boussingault's Rural Econ. in its relation to Chemistry, etc., Law's edition, 1857.

Walnut leaves soaked in water for some hours, then boiled and applied to the skins of horses and other animals, will prevent their being bitten or worried by flies.

In Patent Office Reports, 1855, is a paper on the Persian walnut, or Madeira nut, (*Juglans regia*,) which appears to be well adapted to the climate of the Middle or Southern States. It produces an immense amount of oil and cake. It is preferred to linseed oil, and gives an excellent light. The husk of the walnut is used in dyeing woollen stuffs.

HICKORY, (*Carya amàra*, *porcina*, *alba*, *etc.*) Ell. Sk. The barks are astringent. Mr. Fred. Stearns, of Detroit, has called attention to the bark of the several species of Hickory, in his paper on the medical plants of Michigan, published in the Proc. Am. Pharm. Assoc., 1859, p. 249. Mr. Chaffinbury, of the same State, had found great advantage from chewing the inner bark in dyspepsia, and has used a tincture made from the same bark in intermittent fever. Many in the neighborhood used it, the infusion also being found equally effectual. U. S. Disp., 12th Ed.

A dye for woollens used on the plantation is made from that of most of the species. The fruit of many of the hickory trees is pleasant to the taste, particularly the *C. alba*, shell-bark hickory, which is an article of trade. It should be spared in clearing land.

To color yellow.—"Take three-fourths of hickory bark, with the outside shaved off, and one-fourth of black oak bark done in the same manner; boil them well together in a bell metal kettle until the color is deep; then add alum sufficient to make it foam when stirred up, then put the yarn in and let it simmer a little while; take it out and air it two or three times, having a pole over the kettle to hang it on, so that it may drain in the

kettle; when dry rinse it in cold water." Thornton's Southern Gardener, p. 182. Hickory bark with sugar makes a good yellow dye for wool without copperas. The writer has seen negro clothes and other stuffs dyed on the plantations with either hickory or oak barks, either alum or commercial copperas being used. The crab-apple dyes a canary color. The hickory bark, with copperas, dyes yarns an olive color—with alum, a green—the yarns must be put in hot. The wood of the hickory yields a very fine lye when reduced to ashes, and I will include much that is said of soap under this genus. The wood is also valuable for many purposes in the mechanical arts on account of its weight, pliability, toughness and durability. In Georgia and the Carolinas split hickory is used in making chair bottoms and plantation baskets. In Pennsylvania an oil is extracted from the nuts of the *C. amara*, butternut hickory, which is used for the lamp, and for other inferior purposes. I would suggest that the nuts of any species would serve, if broken and boiled, for the manufacture of soap; subjected to the test of experiment, however, 1863, I could not extract the oil after boiling the broken nuts several hours. I insert the following from Michaux:

"*Properties and uses of hickory wood.*—The wood of all the species of hickory bears a striking resemblance, both as to fibre and the uniform reddish color of the heart. It possesses great weight, strength and unusual pliability and toughness. When exposed to heat and moisture it is subject to rapid decay, and is peculiarly liable to injury from worms.

"Throughout the Middle States it is selected for the axle-trees of carriages, for the handles of axes and other carpenters' tools, and for large screws, particularly those of book-binders' presses. The cogs of mill-wheels are made of hickory heart, thoroughly seasoned; but it is proper only for such wheels as are not exposed to moisture; and for this reason some other wood is by many millwrights preferred. The rods which form the backs of Windsor chairs, coach-whip handles, musket-stocks, rake-teeth, flails for threshing grain, the bows of yokes, or the elliptical pieces which pass under the necks of cattle: all these are objects customarily made of hickory. At Baltimore it is used for the hoops of sieves, and is more esteemed than the white-oak, which is equally elastic, but more apt to peel off in small shreds into the substance sifted. In the country near Augusta,

in Georgia, I have remarked that the common chairs are of hickory wood. In New Jersey it is employed for shoeing sledges—that is, for covering the runners or parts which slide upon the snow; but to be proper for this use it must have been cut long enough to have become perfectly dry.

"Of the numerous trees of North America east of the Alleghany Mountains, none except the hickory is perfectly adapted to the making of hoops for casks and boxes. For this purpose vast quantities of it are consumed at home and exported to the West India Islands. The hoops are made of young hickories from six to twelve feet high, without choice as to the species. The largest hoop-poles sold at Philadelphia and New York in February, 1808, at three dollars a hundred. Each pole is split in two parts, and the hoop is crossed and confined by notches, instead of being bound at the end with twigs, like those made of chestnut. From the solidity of the wood, this method appears sufficiently secure.

"When it is considered how large a part of the productions of the United States is packed for exportation in barrels, an estimate may be formed of the necessary consumption of hoops. In consequence of it, young trees proper for this object have become scarce in all parts of the country which have been long settled. The evil is greater, as they do not sprout a second time from the same root, and as their growth is slow. The cooper cannot lay up a store of them for future use, for unless employed within a year, and often within six months after being cut, they are attacked by two species of insect, one of which eats within the wood and commits the greatest ravages.

"The defects which unfit the hickory for use in the building of houses equally exclude it from the construction of vessels. At New York and Philadelphia, the shell-bark and pignut hickories have been taken for keels, and are found to last as long as those of other wood, owing to their being always in the water. Of the two species, the pignut would be preferable, as being less liable to split, but it is rarely found of as large dimensions as the other.

"In sloops and schooners the rings by which the sails are hoisted and confined to the mast are always of hickory. I have also been assured that for attaching the cordage it makes excellent pegs, which are stronger than those of oak; but they

should be set loosely in the holes, as otherwise, for want of speedily seasoning, they soon decay. For handspikes the hickory is particularly esteemed on account of its strength; it is accordingly employed in most American vessels, and is exported for the same purpose to England, where it sells from 50 to 100 per cent. higher than ash, which is brought also from the north of the United States. The hickories are cut without distinction for this use, but the pignut, I believe, is the best.

"All the hickories are very heavy, and in a given volume contain a great quantity of combustible matter. They produce an ardent heat, and leave a heavy, compact and long-lived coal. In this respect no wood of the same latitude in Europe or America can be compared to them; such, at least, is the opinion of all Europeans who have resided in the United States.

"It has been seen by what precedes that though hickory wood has essential defects, they are compensated by good properties which render it valuable in the arts."

In concluding this article, Michaux recommends particularly for propagation in European forests the shell-bark hickory and the pignut hickory, whose wood unites in the highest degree the valuable properties of the group. He thinks, also, that the pecannut merits attention from promoters of useful culture, not so much for its wood as for its fruit, which is excellent, and more delicate than that of the European walnut. It might probably be doubled in size, if the practice was successfully adopted of grafting this species upon the black walnut, or upon the common European walnut.

Oak and hickory bands for cotton bales.—A tie dispensing with the use of iron or rope bands in bailing cotton has been patented. The editor of the Southern Field and Fireside says on this subject: "Precisely such 'ties' have been used to fasten strong hoops on tubs in distilleries and breweries a longer time than any living man can remember. Thirty years ago we made a score of large tubs for tanning leather, and tied the staves together (made of two-inch plank) as above described, save the teeth on the iron rings or bands. The fastening is very simple and perfectly reliable. A small iron ring, formed like the capital letter D. is used. It should hold both ends of a hoop two inches wide, each end being a half-inch in thickness; and also a wedge three-fourths of an inch thick. Such a hoop, made of oak, ash or

hickory, will have more than four times the strength of the rope usually employed in baling cotton. Green or sound wood is hard to break when pulled lengthwise. On our Southern plantations oak, hickory, ash and grape-vines are much used in place of rope in baling hay, fodder," etc.

The following practical remarks on the manufacture of potash and soap, I introduce here in connection with the hickory, from an editorial by Dr. Lee, in the Southern Field and Fireside, January 18, 1862. (For "Soda," see "*Salsola*," in this book, and "*Quercus*.") The ashes we may obtain by burning corn-cobs yield more potash than any other available substance; and the alkali from this source is rapidly converted into saleratus or good soap. Corn-cobs are mentioned because we often see them wasted in quantities where hogs are fed and where much corn is shelled. Soap-makers at the North buy all kinds of wood-ashes, and find no difficulty in making soap from them; but many Southern negroes, who make a little soap, do not understand the art under consideration. They require ashes from hickory, walnut, poplar, or some other wood rich in potash to succeed in producing good soap. The quantity of lime named in the directions given in the article we copied is two or three times larger than it need be. A peck of recently slaked lime is abundant for a barrel of ashes. Lime that has been long slaked and exposed to the air will not answer. The object of the lime is to decompose all the carbonate of potash dissolved out of the ashes, so that the pure alkali will combine, with grease or oil, to form soap. When the amount of potash in wood is small, as in pines and decayed, wood the whole of the alkali unites with carbonic acid, or some other, if free, when the wood is burnt. When ashes are kept some time, if partly caustic when first burnt from wood they part with their causticity by imbibing carbonic acid from the atmosphere, as freshly burnt lime will do. Hence, recently burnt ashes will often make soap without lime, but will not do if kept several months. As caustic lime has a stronger affinity for carbonic acid than potash or soda has, soap-makers find no trouble whatever in making soap from old ashes, or any ashes that have not been wet and washed. Having stated the reason why lime is used, we will give the simplest and best practice in the art of combining potash with an animal or vegetable oil or fat, which chemical compound is

soap—soft if potash is used, and hard if soda is used. Refuse barrels and hogsheads are often used to drip and leach ashes in, and should stand on boards or plank, so as not to waste the lye. This done, a few inches of clean broom-straw should be placed over all the bottom of the barrel and pressed down. For a hogshead of ashes, a good bushel of recently slaked lime should be spread evenly over all the straw; but a peck of lime will do for a barrel of ashes. More lime will do no harm, and some ashes may require a little more. Now fill up the barrel of ashes, pound them down moderately and pour on boiling water, or that which is hot, until the lye runs out at the bottom. If the ashes are good, this lye will make soap with very little boiling; but if the potash is too diluted, some of the water must be evaporated before the chemical union between the alkali and grease will take place. If too little grease is put in the pot or kettle, more must be added; and if there is too much for all to combine with the potash, the excess must be removed after the soap is cold. Where salt is cheap, it is largely used in the manufacture of bar soap. Turpentine and rosin are also used in this branch of business. The explanations in reference to soda and turpentine soap will be given elsewhere. Salt is at times too expensive to be used in soap-making.

In an article on Soap and Potash from the Atlanta Commonwealth, in the Southern Field and Fireside for October, 1861, great stress is laid upon the ease with which we can manufacture potash in large quantity within the limits of the Southern States, and the consequent production of soap: "But whether we make our soap or establish manufactures, we need lye or potash in large quantities. To have this we must burn the light kind of wood, for some wood is better than other sorts, and we must save all the ashes and take good care of them. The ashes should not only be saved for this purpose, but to be used as manure. It is a shame that we have been so long and so willingly dependent on the North for so large a catalogue of the commonest articles, and even for the article of soap."

The following on the same subject is from the Richmond Dispatch, which I condense: "The great scarcity of Soap at the present time arises from the want of potash and soda ash. Either will make soap. The latter is found in its natural state

(*natron*) in Egypt and South America, but the principal supply has been obtained from Great Britain, procured by the burning of sea-weeds. The former (potash) is supplied mostly from Canada and the State of New York. There is in the Southern States any quantity of material to make potash, and I would call the attention of farmers to its production. It requires but a simple process in its manufacture—a few large iron pans and a half dozen whiskey barrels, with heads out, and an iron ladle, being all the apparatus required.

"Most weeds furnish potash, in a greater or less degree, to every one hundred pounds. The following plants will furnish of potash:

Oak wood	2½ lbs.	Potato stem	55 lbs.
Wheat straw	4½ "	Corn-stalks	17 "
Barley straw	5 "	Oak bark and elm leaves	24 "

"These articles can be obtained by the farmers at little cost. Select a shaded position, gather in a large heap, set fire to it, keeping the fire up until several bushels of ashes are obtained; fill each barrel about one-quarter full of slaked lime; fill it then with water, stirring the ashes well; let it stand over night, or for about twelve hours, *stirring* frequently; strain off the lye as clear as possible; pour in the kettles and evaporate over a wood fire. The kettle should be kept constantly full for two days, (a little experience will soon teach the quantity of lye it will require to make them half full with potash.) The evaporation should be continued until the mass obtains the consistency of brown sugar; then increase the fire, by which it will be fused; continue it until quiescent and looks like melted iron; with a ladle transfer it to iron pans or baking ovens, and allow it to cool; it may be then broken in pieces and packed in tight boxes or barrels. The experiment will pay well any enterprising farmer. The article cannot now be obtained at any cost, and can be sold at a high rate. We hope this may induce some to try it. The expense of fixtures is small. Pine wood furnishes but little potash."

Ure, in his Dictionary of Science and Manufactures, art. *Potash*, p. 457, says: In America where timber is in many places an incumbrance upon the soil, it is felled, piled up in pyramids and burned, solely with a view to the manufacture of potashes. The ashes are put into wooden cisterns having a plug at the

bottom of one of the sides under a false bottom; a moderate quantity of water is then poured on the mass, and some quicklime is stirred in; after standing for a few hours, so as to take up the soluble matter, the clear liquor is drawn off, evaporated to dryness in iron pots, and finally fused at a red heat into compact masses, which are gray on the outside, and pink-colored within. All kinds of vegetables do not yield, he adds, the same proportions of potassa. The more succulent the plant, the more does it afford; for it is only in the juices that the vegetable salts reside, which are converted by incineration into alkaline matter. Herbaceous weeds are more productive of potash than the graminiferous species, or shrubs, and these than trees; and for a like reason twigs and leaves are more productive than timber. But plants in all cases are richest in alkaline salts when they have arrived at maturity. The soil in which they grow, also, influences the quantity of saline matter. The following table exhibits the average product in potassa of several plants, according to the researches of Vauquelin, Pertuis, Kirwan and DeSaussure:

In 1000 parts	*Potassa.*	*In 1000 parts*	*Potassa.*	*In 1000 parts*	*Potassa.*
Pine or fir	0.45	Thistles	5.00	Bastard chamomile—	
Poplar	0.75	Flag stems	5.00	*Anthemis cotula*, L.	19.06
Trefoil	0.75	Small rushes	5.08	Sunflower stalks	20.00
Beechwood	1.45	Vine roots	5.50	Common nettle	25.03
Oak	1.53	Barley straw	5.80	Vetch plant	27.50
Boxwood	2.26	Dry beech bark	6.00	Thistles, full gro'th	35.37
Willow	2.85	Fern	6.26	Dry straw of wheat	
Elm and maple	3 90	Large rush	7.22	before earing	47.00
Wheat straw	3.90	Stalk of maize	17.15	Wormwood	73.00
Bark of oak twigs	4.20	Bean stalks	20.00	Fumitory	79.00

Stalks of tobacco, potatoes, chestnut-husks, broom-heath, furze, tansy, sorrel, vine leaves, beet leaves, orach and many other plants abound in potash salts. In Burgundy the well known *cendres gravelées* are made by incinerating the lees of wine pressed into cakes and dried in the sun; the ashes contain fully sixteen per cent. of potassa. To manufacture *carbonate of potassa*, chlorate, etc., from ashes, see, also, Ure's Dictionary. The corn-shuck and cob contain potash, and an economical soap is made from corn-shucks. See "*Zea*," in this volume.

Count Chaptal, "Chemistry applied to Agriculture," p. 290, refers to the method of using economy in washing and bleaching cloths, linen, etc., by a soapy liquor, a solution of oil and

soda, in place of ordinary soap. He also introduces and describes a plan for washing and cleansing household linen and cotton yarn by steam from alkaline solutions. The expense is three-sevenths of the expense of the common method.

I introduce the following from Chaptal's Chemistry applied to Agriculture, as it shows the very different composition of different plants—the potato, for example:

"It appears that the three earths which form the basis of the most fertile soil enter into the composition of plants. Bergmann has proved this by an analysis of several kinds of grain, and Ruckert, by the results of his experiments upon a variety of vegetable productions, in a way to put it beyond doubt. About one hundred parts of ashes well leached, and consequently disengaged of all their salts, yielded:

		Silica.	*Lime.*	*Alumina.*
Ashes of	wheat	48	37	15
"	oats	68	26	6
"	barley	69	16	15
"	rye	63	21	16
"	potatoes	4	66	30
"	red clover	37	33	30"

"*Soft soaps*," says Ure, "are usually made in this country with whale, seal, olive and linseed oils, and a certain quantity of tallow; on the Continent, with the oils of hemp-seed, sesame (*bené*, which is planted in the Southern States,) rapeseed, linseed, poppy-seed and colza, or with mixtures of several of these oils. When tallow is added, as in Great Britain, the object is to produce white and somewhat solid grains of stearic soap in the transparent mass, called figging, because the soap then resembles the granular texture of a 'fig.'" "The potash lyes should be made perfectly caustic, and of at least two different strengths," etc. See Ure, p. 668, for method. Any of the seeds of our oily plants, the cultivation of which I have so often recommended, can be pressed in a flannel bag in an ordinary cotton press. If the pressure is exercised in a warm room heated by a stove, the escape of the oil will be much facilitated.

A lye made of wood ashes will stop the rust in wheat, if the seeds are soaked in it before being planted for two or three hours. It is a useful substitute at this time for the brine which is usually made of sulphate of copper or salt.

Dennis, of Key West, Florida; also P. O. Reports, 1857, p. 133. The mode of crystallizing, etc., is explained in a plain, practical manner, with wood-cuts of machinery. Evaporation through thorns, wood-shavings, etc., is described.

PECAN; MISSISSIPPI NUT, (*Carya olivæformis.*) Cultivated in the Atlantic States.

I have observed it growing wild in Ward's swamp, St. John's Berkeley, S. C., in company with the *C. myristicæformis* or nutmeg hickory of Mx. No doubt the fruit was disseminated from neighboring plantations, where it is cultivated. The fruit of the plants of this order are favorite articles for table use in the Southern States. The pecannut is rich and nutritious, and the tree might be planted as a source of profit, as it is a rapid bearer, attaining a large size.

Michaux advises that the shoots should, for the purposes of fruiting, be grafted on stalks of the common walnut tree. The tree abounds in upper Louisiana and Illinois. A swamp of eight hundred acres is said to exist on the right bank of the Ohio, opposite the Cumberland River. The wood is coarse grained, heavy and compact. Michaux.

SAURURACEÆ.

SWAMP-DRAGON; LIZZARD'S TAIL, (*Saururus Cernuus*, L.) Grows in inundated soils; Richland; vicinity of Charleston; Newbern; and collected in St. John's, where the root is used, in the form of a poultice, in discussing tumors, and as an application in abscess of the breasts occurring after labor. It is thought by many to possess great value in this respect. In a note to Ell. Bot., 505, it is also said that the fresh root is applied with advantage as an emollient and discutient to inflamed surfaces. After the frequent employment of the boiled roots of this plant beaten up and used as an economical material for poultices, I would particularly recommend it, as the roots can be abundantly and easily obtained in almost every swamp along the seaboard. Whether it is endowed or not with medicinal properties it is a pleasant, soothing application, adapted to the wants of large bodies of soldiers in camp, or negroes on our plantations. I have employed it to promote suppuration in mammary abscess. Grease may be added to the mass.

SALICACEÆ. (*The Willow Tribe.*)

Bark generally astringent, tonic and stomachic.

BLACK OR SWAMP WILLOW, (*Salix nigra*, L.) Grows along streams; Richland; vicinity of Charleston; collected in St. John's; Newbern. Fl. May.

Bell's Pract. Dict. 403; U. S. Disp. 622. See work of younger Michaux, Ball. and Gar. Mat. Med. 337; Mér. and de L. Dict. de M. Méd. vi, 185; Griffith, Med. Bot. 583; Schœpf, Mat. Med. 43; Ell. Bot. Med. Notes, ii, 671. The willow is supposed to furnish us with one of the best substitutes for Peruvian bark; the *S. alba*, which may be included among the many varieties found in the Southern States, and which are not yet accurately distinguished, seems to be held in high estimation. But this species, also, is considered valuable; the bark possessing some power as a purgative, anti-intermittent and vermifuge. It also furnishes the principle called *salicin*, which, from the results of late experiments, is found to be much less valuable than *quinia*, but is a good bitter tonic. See Journal Phil. Coll. Pharm. for the mode of preparation. The bark of the root and branches is officinal It is tonic and somewhat astringent. The decoction made with one ounce of bark to one pint of boiling water, of which the dose is two fluid ounces, should be boiled ten minutes, and strained while hot. Dose of *salicin* from two to eight grains and increased. It might well attract attention as a substitute for quinine. The large stems of this tree are light and durable, and are used for the timbers of boats.

There are several other species in the Southern States. The willow—osier willow, (see article in Farmer and Planter, Sept., 1861,) is cultivated extensively in Germany, France and Belgium for making baskets, hats, screens, etc., etc. After most careful experiment it has been found that the best species to introduce into the Southern States for the purpose, are the *Salix forbeyana*, *Salix purpurea*, purple willow and *Salix triandra*, long-leaved willow. *Forbes' willow* is very productive and hardy, one of the most valuable species for common work, where unpeeled rods are used. It does not whiten well.

Purple Willow.—Experiments have shown that this species is the most valuable and profitable for osiers in this country. With good ordinary culture its shoots will average ten feet in

length; will thrive best in deep, moist soil, where it will easily yield from four to five tons per acre of the most excellent rods, well qualified for the finest work. The purple willow, aside from being the most valuable for manufacturing all the finest kinds of willow-ware, is the best species for hedges, and is most extensively used for that purpose in Germany and Holland. The leaves and the bark being so very bitter will not be touched by cattle, while the shoots may be formed into any shape, and the hedge thereby made impregnable. Fine hedges or screens of twenty-five feet in height may be grown from willow cuttings of this species in five years, thus affording almost immediate shelter, so indispensable at all seasons of the year. We have seen, the writer adds, screens in Russia, of the willow, forty-feet high, surrounding parks from three to four hundred acres in extent, affording the most perfect shelter against the sweeping winds and storms. Its soft, green and glossy foliage will make it an object of great beauty and attraction.

The last mentioned, the *Salix triandra*, long-leaved willow, will grow with almost equal vigor in any soil of depth; ripens its shoots very early and whitens beautifully; is tough and pliable, and a general favorite with our German basket-makers for split-work. This willow is most extensively cultivated in Germany by the thousands of acres. Its cultivation is highly esteemed by the people and much encouraged by the government.

Salix caprea, though not valued as an osier, is deserving of attention, as it will grow in wet situations where other trees will hardly exist. It furnishes food for bees at a time when it is most needed. In early spring, before other flowers appear, this tree is a mass of dazzling bloom, most eagerly sought after by bees. This willow is also valuable for hoops.

The cuttings, in our climate, should be prepared in fall or early winter, and if planted at that time the ends will form the callosity preparatory to sending out roots. In setting the cuttings in the ground prepared for them, care should be taken to have them set deep enough; a small portion only should remain above ground, the strongest roots always start from the lower end of the cutting or set; by doing so the most vigorous growth will be obtained.

In establishing a willow plantation, cuttings of vigorous up-

land growth, that have had an abundance of room, should only be purchased and used, and, if obtainable, select wood of one year's growth, with a portion of two years wood from the lower extremity. Deep soils, free from standing water, but yet so soft that plowing is impracticable, will grow enormous growths of *S. triandra*, requiring no further cultivation but keeping the weeds down for the first year or two, after which time the willows will be of sufficient strength to take care of themselves, and provide for their own shade and well-being. We have in the Southern States large districts of deep alluvium, often inclining to swamps, which are so much drained as to do away with their swampy character, and with no other preparation than removing the trees, may make excellent willow plantations. Sir J. W. Hooker observes: "The many important uses rendered to men by the different species of willow serve to rank them among the first in the list of our economical plants." The editor of the Southern Farmer and Planter then quotes a statement by W. P. Rupert, of Geneva, N. Y., showing a net profit of $533 per acre from planting the osier willow.

See, also, Chaptal's Chemistry applied to Agriculture for the method of planting willow along borders of land liable to inundation, to lessen the force of the water, to strengthen the soil, and reclaim the land. A border of willow and poplar is planted over the banks or along the sides of the watercourses, and the plants are cropped at the tops so as to increase the thickness of their growth.

In a paper in Patent Office Reports on Agriculture, p. 46, 1851, by W. G. Haynes, of Putnam County, N. Y., it is stated that four or five million dollars worth of willow were imported annually into the United States from France and Germany. The prices ranged from $1 to $1 30 per ton weight. The writer confines his attention to the "three kinds best adapted for basket-making, farming, tanning and fencing." He says: "The *Salix viminalis* is that specimen of all others best adapted for basket-makers. An acre of this properly planted, and cultivated upon suitable soil, will yield at least two tons weight per year." See the paper cited for yield. The people of England, till 1808, relied entirely for their supply upon Continental Europe. The *Salix alba*, or Bedford willow, is much planted by the Duke of Bedford. "The bark is held in high estimation

for tanning, the wood for shoemakers' lasts, boot-trees, cutting-boards, gun and pistol stocks, and house timber; the wood being fine grained, and susceptible of as fine a polish as rosewood or mahogany. An acre of this kind of wood, ten years old, has sold in England for £155." The "*Salix alba* is extensively used by retired tradesmen who build in the country for the purpose of securing shade in a short time, and by the nobility around their fish-ponds and mill-dams, and along their water-courses and avenues. This is the principal wood used in the manufacture of gunpowder in England." It requires twelve thousand cuttings to plant one acre. Much land worth for little else might be planted in willow.

The next species is the Huntingdon willow, (*S. caprea*,) "which is a good basket willow, and is used extensively in England by the farmers for hoop-poles and fencing. Their manner of planting for fencing is by placing the ends of the cuttings in the ground, and then working them into a kind of trellis-work, and passing a willow withe around the tops or ends, so as to keep in shape for the first two years. They cut the tops off yearly, and sell them to the basket-makers, thus having a fence and crop from the same ground." Another description of fence is also made from the *Salix caprea*, "known in England by the name of hurdle fences, which may be removed at the pleasure or discretion of the proprietor."

In England, Wilson says, an acre of osier will yield greater profit than one of wheat. The *Salix purpurea*, as was stated, is also valuable. "The cutting of a basket twig should be made slopingly within three buds of the point whence the shoot issued; and the cutting of a hoop willow may be made so low as to leave only the swell at the bottom of the shoot. Basket twigs are commonly sorted into three sizes, and tied into bundles of each two feet in circumference; and when they are to be peeled, they are set on their thick end, a few inches deep in standing water, and left there till commonly the latter part of the following May. The apparatus for peeling is simply two round rods of iron, nearly half an inch thick, sixteen inches long, and tapering a little upward, welded together a little at one end, which is sharpened, so that it may be easily thrust down into the ground. When thus placed in a piece of firm ground, the peeler sits down opposite to it, and takes the willow

in the right hand by the small end, and puts a foot or more of the great end into the instrument, the prongs of which he presses together with the left hand, and with the right draws the willow toward him, by which operation the bark will at once be separated from the wood; the small end is then treated in the same manner, and the peeling is completed. After being peeled they will keep in a good condition for a long time, till a proper market be found. Rural Cyc.

Charcoal made of willow or oak is a useful anti-septic agent, possessing the power of absorbing gases, and useful in dyspepsia and ill-conditioned states of the gastro-intestinal mucous membranes. It is also used as a mechanical laxative, in doses of ten to fifteen grains. It is supposed to act as a prophylactic in yellow fever, and to prevent the acetous fermentation when added to casks of wine, cider, etc. In preparing it, the common charcoal from green wood is reduced to powder. This is reheated and burned to ignition in a tightly covered vessel. It is then kept for use in closely stopped bottles, as it will absorb moisture and gases from the atmosphere. It is used also as a general purifyer. Brackish water strained through a layer of sand and powdered charcoal is made sweet and pure.

For making *gunpowder charcoal*, the lighter woods, such as the willow, dogwood and alder, answer best; and in their carbonization care should be taken to let the vapors freely escape, especially toward the end of the operation, for when they are re-absorbed, they greatly impair the combustibility of the charcoal. The charcoal of some wood contains silica, and is, therefore, used for polishing metals. Dr. Mushet published the following table of the quantity of charcoal yielded by different woods:

Chestnut	23.2	of charcoal—glossy, black, compact, firm.
Oak	22.6	black, close, very firm.
Walnut	20.6	dull black, close, firm.
Holly	19.9	dull black, loose and bulky.
Beech	19.9	dull black, spongy, firm.
Sycamore	19.7	fine black, bulky, moderately firm.
Elm	19.5	fine black, moderately firm.
Norway pine	19.2	shining black, bulky, very soft.
Sallow or willow	18.4	velvet black, bulky, loose, soft.
Ash	17.9	shining black, spongy, firm.
Birch	17.4	velvet black, bulky, firm.

[*Am. Farmer's Enc*

On the subject of *Nitre*, and the materials for gunpowder, I will introduce the following from Chaptal's Chemistry, applied to Agriculture, p. 153, and refer the reader to Prof. Leconte's paper on nitre beds, published in Columbia, 1862. Different kinds of wood, he says, yield coal of very different quality; the best coal is heavy and sonorous, and is produced from wood of very compact fibre. The heat it affords is quick and strong, and its combustion, though vigorous, lasts a long time. The charcoal of the green oak of the South burns at least twice as long as that of the white oak of the North, and the effects produced by the heat it affords are great in the same proportion.

The light, porous, white woods afford a brittle, spongy coal, of less weight, and which may be easily reduced to powder; this coal consumes quickly in our fireplaces, but is useful for some purposes, particularly in the manufacture of gunpowder, for which use it is prepared by the following process: a ditch of five or six feet square and of about four in depth is dug in a dry soil; the ditch is heated by means of a fire made of split wood; the shoots and leaves are stripped from the long branches of elders, poplars, hazels and willows, of which the coal is to be made, and as soon as the ditch is sufficiently heated the branches are thrown gradually in; when carbonization is at its height the pit is covered over with wet woollen cloths. This charcoal is more light and inflammable than that of the denser woods, and is susceptible of being more easily and completely pulverized. M. Proust, who has made numerous experiments to ascertain the kinds of plants which furnish the best coal for powder, found that procured from the stalk of hemp to be preferable to any other.

The most perfect process of carbonization is by means of a close apparatus; for this purpose a stone or brick building is constructed of eighteen to twenty-five feet square; this is matted over and the inside of it lined with a brick wall; through the extent of it cast-iron cylinders are laid in such a manner that one of the two ends shall have an external communication, while the other carries the smoke into one of the chimneys. As soon as the building is filled with the wood for carbonization the cylinders may be heated. The vapor which is distilled from the wood is received into sheet-iron pipes, placed in the top, which convey it into tubs where it is con-

densed. Count Chaptal esteems this to be the best and most economical apparatus for making charcoal; besides, it allows the preservation of the pyroligneous acid, which brings a good price, and may also be purified and converted into vinegar.

In England, charcoal is prepared in two different ways. In one, billets of wood are formed into a heap, which is covered with turf, and a few small openings only left for the admission of the air requisite to maintain it in a state of low combustion after it is lighted. When the whole heap is on fire, the holes are stopped, and after the mass has cooled the residue is charcoal. This is substantially the method adopted on our plantations. In the other mode, the wood is distilled in iron cylinders, in which case the products are pyroligneous acids and empyreumatic oil; and what remains in the retort is charcoal. The quantity of the distilled products, as well as of the charcoal, depends on the kind of wood employed. One hundred parts of dried oak yields of pyroligneous acid, 43. parts; carbonate of potassa, 4.5 parts; empyreumatic oil, 9.06 parts; charcoal, 26.2 parts. Farmer's Encyc., Ure's Dict. of Arts and Rural Cyc. See, also, "*Quercus*" and "*Pinus*," in this volume.

Five hundred cords willow was contracted for, to be delivered on the line of the canal, at the government powder factory, at Augusta, Ga., during the recent war. "The willow may be of any size, the smaller branches being preferred; the larger sticks must be split into parts not larger than the arm. It must be cut into uniform lengths of three feet, and each cord will measure fourteen feet long, three feet high and three feet broad, containing one hundred and twenty-six cubic feet. The bark must be carefully peeled off at the time of cutting."

Purification of Water by Charcoal.—The reader is referred to Chaptal's "Chemistry applied to Agriculture" for much that is practical in the domestic economy of our plantations in the South on the manufacture of wine, brandy, etc. In his chapter on the "means of preparing wholesome drinks for the use of country people," he gives the following method for rendering impure water pure. It would be found of great service at the present time, and our generals in the field might thus, at little cost, purify water for the use of their camps, for want of which simple expedient, moves, possibly disastrous, have often to be made in face of an enemy. "The water made use of is often muddy,

or has a bad smell, either of which faults may be corrected by filtering it through charcoal; the process may be performed in the following manner: place a large cask upright, in the coolest situation you can command, knock out the head, and form in the bottom of it a bed of clean sand upon which place one of charcoal, and above these fasten securely a double head pierced with holes. When this is done the cask may be immediately filled with the water which is to be purified. The filtrated fluid may be drawn off by means of a stop cock placed at the bottom of the bed of sand; it will be found to have become clear and inodorous in its passage through the sand and charcoal. The preservation of this apparatus requires but little care; when the charcoal ceases to produce the desired effect, it must be either well washed or replaced by a new portion." This plan can be put in practice by any one, and at any time.

WEEPING WILLOW, (*Salix Babilonica.*) Completely naturalized.

It forms one of our most beautiful and graceful ornamental trees. Only the pistillate plant is found here; and hence it does not mature its fruit as the others do.

WHITE POPLAR, (*Populus alba.*) Introduced.

This is an aquatic plant, yet will grow on dry soils. It is easily propagated by suckers, grows rapidly, is very tenacious of life, and is one of the trees planted to prevent the encroachment of the sea or rivers, by being planted with willows on the margin. See, also, willow, (*Salix.*)

The poplar has a very white, light wood, very suitable for flooring; also eminently suited, on account of its lightness, for the manufacture of trays, bowls, etc. "It is excellently adapted for the purposes of the bellows-maker, and of the manufacturer of wooden soles of shoes; it is good for light carts; excellent also for laths and packing-cases; very superior for wooden constructions under water; and in fact as available for an almost innumerable variety of purposes, from the mean ones of fuel and poles to the noble ones of tools and furniture. Pontey even asserts it to be perfectly suitable for almost every article usually made of mahogany, and quite capable of being stained and doctored into a very close imitation of that valuable wood." Wilson. The wood of our wild, tulip-bearing poplar (*Liriodendron*) is adapted to similar purposes, being light, and easily

worked, and used by the cabinet-maker for many purposes. It is stated in the Farmer's Encyclopœdia that by splitting the wood of the white poplar into thin shavings like tape or braid, the stuff called *sparterie*, used for hats, is manufactured. These shavings are always made from green wood. One workman can, with the aid of a child to carry off the shavings, keep several plaiters employed. This might be made a source of successful industry in the Southern States.

Paper from Wood Pulp.—A company of two hundred gentlemen, representing the newspaper and book publishers of New York, Boston and this city, paid a visit (1866) to the Manayunk Wood Paper Pulp Works, and witnessed the entire process of converting cord wood into paper pulp, and its manufacture into paper. The pulp works are very extensive, buildings and machinery having cost $500,000. The great feature of the works is the economy in the use of chemicals, which disintegrate the wood and bleach the pulp, the refuse being carried to the evaporating house, where the chemicals are rendered fit for using again, only twenty per cent. of fresh stock being added to make it equal to its former strength. A *poplar* tree was taken from the hill-side for their benefit, and converted into clear, white, soft paper, in the space of five hours. At the adjoining, Great Rock Paper Mills, excellent printing paper is made with eighty per cent. of wood pulp and twenty per cent. of straw pulp. From ten to fifteen tons of wood pulp are turned out daily. The works have but recently gone into operation, and already the price of paper is reduced three cents per pound.

Upon examining the excrescences caused by an insect in large numbers on the leaves of the cotton-wood tree, (*P. heterophylla*, L.,) I find them possessed of great bitterness, and suggest an examination into their tonic properties.

BALSAMACEÆ.

SWEET GUM, (*Liquidambar styraciflua*, L.) Diffused from Fla. to Maryland. Fl. March.

U. S. Disp. 273; Pe. Mat. Med. and Therap. ii, 184; Ed. and Vav. Mat. Med. 303; Journal Phil. Coll. Pharm. vi, 190; Royle, Mat. Med. 562; Bergii, Mat. Med. ii, 798; Linn. Veg. M. Med. In former times the resin was used in scabies; and it is said

(Am. Herbal. by J. Stearns) to be useful in resolving hard tumors in the uterus. The Indians esteemed it an excellent febrifuge, and employed it in healing wounds. Mér. and de L. Dict. de M. Méd. iv, 128, and the Supplem. 1846; Ann. de Montpellier, 1805, 327; Journal de Pharm. vii, 339, and vii, 568; Bull. de Thérap., October, 1833, where D. L'Héritier proposes to treat blennorrhagias and leucorrhœas with liquid styrax. A kind of oil, called *copalm*, is extracted from it in Mexico, which, when solidified, is called copalm resin; this is an excitant of the mucous system, and it is given in chronic catarrhs, and in affections of the lungs, intestines and urinary passages. This is cordial and stomachic; it excites both perspiration and urine; it is also used in perfumery. In South Carolina and Georgia the temperature is not high enough for this tree to furnish much gum. Dr. Griffith experimented with it in the latitude of Baltimore, and obtained a small quantity by boiling the twigs and branches; he found that it exists in greatest abundance in the young trees just before the appearance of the leaves. It is about the consistence of honey, of a yellow color, and of a pleasant, balsamic odor and taste. The acid obtained from the gum is not benzoic, as the English assert, but *cynamic*. See Am. J. Pharm. The tree is of rapid growth, and is ornamental—frequently assuming the appearance of a sugar-loaf. The wood is soft, but not durable. A decoction of the inner bark of the gum in a quart of milk, or a tea made with boiling water is one of the most valuable and useful mucilaginous astringents that we possess. It can be employed with advantage in cases of diarrhœa and dysentery. Dr. C. W. Wright, of Louisville, Ky., states that the bark of the tree is used with great advantage in the Western States in the diarrhœa and dysentery of summer, especially in children. A syrup from the bark is prepared in the same manner as the syrup of wild cherry bark. The dose is a fluid ounce for an adult, repeated after each stool. Am. J. Med. Sc. N. S. xxxii, 126. The editor of the Va. Med. J., August, 1856, says that the use of a decoction of the bark in milk is common in many parts of Virginia as a remedy in the diarrhœa of children. U. S. Disp., 12th Ed. In Georgia, also, a common domestic remedy for diarrhœas is made by boiling in water equal parts of the barks of the red oak and sweet gum—a small proportion of spirits may

often be added with advantage. Dr. Wright claims that the syrup is retained by an irritable stomach when almost every other form of astringent medicine is rejected. See, also, Parrish Pract. Pharm., p. 230.

Leaves of native trees for Tanning Leather recommended in place of Oak bark.—During the months of October and November, 1861, I had the leisure to make some experiments upon the relative amount of the astringent principles in the *leaves* of several of our most abundant native trees. The reputed power of the dogfennel and other plants for the rapid tanning of leather attracted my attention to the subject. I publish the following, that the green leaves may be collected and used before they fall. They can be much more readily obtained than oak bark. I made two series of experiments, with a solution of each leaf in boiling water, in separate test-glasses. After they had remained a sufficient time for the coloring matters and the astringent principles to be extracted, I subjected each to the appropriate reagents. Solutions of iron as well as gelatine were employed, which responded perfectly, and gave delicate shades of difference. The leaf, well chewed and tasted, also gives a very good idea of its astringency, and consequently affords an approximation to the *tannin* and *gallic acid* it contains. It will be seen that the *leaves* of the sumach, sweet-gum, myrtle, blackberry, *Clethra tomentosa* and *Andromeda nitida*, (both abundant in our damp pine barrens, along the margin of ponds,) and the *fruit* of the unripe persimmon, contain the largest amounts of tannin, and perhaps gallic acid.

I took special care to select trees, for the most part, which grew plentifully, and I particularly recommend those just mentioned to be used in lieu of oak bark for tanning leather, on account of their abundance and the ease with which the fresh leaves can be gathered, and because of the scarcity of the oak, and the injury to these valuable timber trees. If the oak is deprived of its bark the wood should always be converted into ashes.

The dogfennel, (*Eupatorium fœniculaceum* (?) see *Eupatorium*,) occupied a very inferior position as a tanniniferous plant, and I have since learned that its reputed value was only illusory.

FIRST SERIES.

(Relative amount of Astringency (tannin) expressed by numerals.)

1. *Clethra alnifolia*, L. (*C. tomentosa*, Lam.) Diffused in damp pine lands.

1. *Andromeda nitida.*

1. Fruit of unripe Persimmon, (*Diospyros Virginiana;*) color of solution, bluish black.

2. Sweet-Gum, (*Liquidambar styraciflua.*)

2½. Swamp Myrtle, (*Myrica cerifera.*)

3. Sweet Swamp Bay, or Laurel, (*Magnolia glauca.*) All the above rich in tannin.

4. Oak Leaves, Black Jack, (*Quercus nigra*, L.)

5. Leaves of Persimmon.

6. Sassafras, (*Laurus Sassafras*,) a trace.

7. *Prinos Glaber*, (ink-berry.) Tannin not very evident.

SECOND SERIES.

1. Sumach, (*Rhus copallina*, L. and *R. Glabra.*)

2. Blackberry, (*Rubus villosus* and *trivialis*,) both very rich in tannin.

3. Sweet leaf, (*Hopea tinctoria*,) tannin slightly present.

4. Dogfennel, (*Eupatorium fœniculaceum*,) a trace.

5. Sassafras, a trace.

6. Gall of the earth, (*Erenanthes alba*,) very bitter; tannin, none.

Both the leaves and the excrescences on the leaves of the smooth Sumach, (*Rhus glabra*,) growing along streams in the upper districts, are very rich in tannin and should be used. The Alder, (*Alnus serrulata*,) abundant along watercourses, is also astringent. The reader can find a list of the plants and trees yielding tannin in Ure's "Dictionary of Arts, Manufacture and Mines." See, also, Oak ("*Quercus*") and Sumach ("*Rhus*") in this volume.

M. Dussauce, in "his New and Complete Treatise on the Arts of Tanning, Currying and Leather Dressing, Philadelphia and London, 1847," states that the foliage of very few trees are employed in the manufacture of leather. He does not refer to the Carolina myrtle or gum as tanniniferous plants. I will include under this section a list of those trees, the leaves of

which he mentions as being used for tanning. Very few of the species cited by him grow in the South, but the plants belong to the genera *Salix*, *Sorbus*, (*aucuparia*,) *Punica*, *Fagus*, *Cornus*, *Betula*, *Rumex*, *Quercus*, *Prunus*, *Amygdalus*, (*Persica*,) *Geranium*, *Œnothera*, (*biennis*,) *Tilia*, *Arbutus* and *Rubus*.

He cites the following, the flowers and flower tops of which may be used for tanning. I select only those which are indigenous or naturalized within the limits I have prescribed to myself:

Agrimonia eupatoria, *Hypericum perforatum*, (St. John's-wort,) *Polygonum persicaria*, *Plantago major*, (Plantain,) *Humulus lupulus*, (Hop.) The seeds of the grape and the roots of *Statice Caroliniana*, (Marsh Rosemary,) also contain tannin.

CALLITRICHACEÆ.

STAR-WORT; WATER CHICKWEED, (*Callitriche verna*, W., *Callatriche heterophylla*, Ell. Sk.) Grows in shallow water; collected in St. John's; vicinity of Charleston. Fl. May.

Shec. Flora Carol. 326. It is considered by the planters a valuable diuretic remedy in dropsy. The tincture of the whole plant in spirits is employed. A decoction is given to horses when diuresis is desired.

SANTALALES.

BLACK-GUM; NARROW LEAVED TUPELO; SOUR-GUM, (*Nyssa aquatica*, L. The roots are immersed in inundated soils; collected in St. John's; observed in Fairfield District; vicinity of Charleston; Newbern.

The roots are white, spongy and light, and are sometimes used in the Southern States as a substitute for cork; I am informed by a friend who has had bottle corks cut from them that they answer perfectly, and the floats for the nets of fishermen are generally made of the tupelo.

The genus exhibits a constant peculiarity of organization, ("the fibres are united in bundles and interwoven like a braided cord,") hence the wood is extremely difficult to split, unless cut into billets—much used for hubs of wheels; also preferred for the *sideboards* of carts. Am. Sylva. Trays, bowls, dippers,

mortars, and other utensils are manufactured from it. I had recommended it as a suitable material during the war for shoes in my article in DeBow's Review, August, 1861, and have since had a number made from the wood of the roots for negroes residing on plantations in South Carolina. It is recommended that only the sole of the shoe be made of wood, an inch in thickness, cowskin, with the hair turned inside, being nailed on this over a last; the hardness of this which is an objection, may be diminished by soaking in salt and water. I have used sheepskin, though canvas is next best to leather. The wood should be well seasoned, or it will crack; boiling will prevent this if the fresh wood is used. It is advised that when the black-gum is used in the manufacture of shoes, "for complete protection against moisture, a slip or inner sole and lining of any water-proof material may be added."

I introduce the following from the "Farmer and Planter," as not inappropriate. Every one who has visited Europe has seen the *sabot* worn by the peasantry:

It cannot be denied that a number of diseases must result from the wearing of leather shoes by laborers, when engaged in out-door operations during cold weather, or in wet situations. In Germany, Belgium and France, in order to prevent those evils, at least to some extent, the use of wooden shoes has long since been introduced, and they are extensively worn by the whole farming and laboring population.

The governments of Europe have very much encouraged the manufacture of the same, and their preference over leather shoes is much recommended by all boards of agriculture and of health. There is hardly an operation on the farm and about the farm-houses, the garden, etc., in which they could not be most profitably used. They are perfectly secure against the penetration of water, and being always dry, will keep the feet warm and thereby prevent many diseases. They are light and easy to wear, of a pleasant appearance, may be blackened or varnished. They can be worn with or without stockings; and, with many other advantages, they combine such durability as to last almost a lifetime, at a cost of from twenty-five to thirty-seven cents. They are certainly entitled to the attention of the farmers and laboring population of the South. The wood

for their manufacture is to be had in great abundance in most of our Southern States.

The following is on the same subject:

Shoes without Leather.—Messrs. Howes, Hyatt & Co., shoe and leather dealers, in the City of New York, manufacture a plantation brogan, differing from the old shoe, in having soles of some light, tough wood—probably the root of the swamp poplar. They patented the invention and warrant the brogan to outlast the best of the leather-soled. Planters on the Mississippi had tried them, and found that they were warmer, more durable, and more impervious to water than the leather-soled. The soles were made by machinery. The upper leather was first securely tacked to the inner sole, and the under sole securely fastened to the upper by about a dozen iron screws, securing the upper leather between the two soles. With soles of wood and uppers of canvas we can be independent of leather in times of war and blockade.

Mr. W. Gilmore Simms suggests to me the use of the tupelo, on account of its lightness, for making cartridge boxes. Surg. Carrington, Med. Director late C. S. A., Richmond, Va., employed the tupelo to test its advantages as a material for the manufacture of artificial limbs, and Gen. Walker informs me, 1866, that he uses a leg made of the white tupelo, and that it surpasses every other for lightness.

It is necessary to distinguish between the wood of these trees. The roots of the white tupelo furnishes a material so light as to resemble cork very closely. The body of the tree also furnishes a very light wood. It always grows in ponds. The Black tupelo or black gum, sometimes grows on highlands—the wood is also very light, but it possesses a firmer texture, by the interlacement of the fibres, as I have observed—hence the adaptability of the wood of the root for making bowls, shoes, naves of carts, etc. The wood of the root is in each lighter than that of the body of the tree.

The *N. capitata*, of Walt., the Ogeechee Lime, growing in the swamps of Florida and Georgia, near the coast, has a fruit which is agreeably acid. Dr. J. H. Mellichamp writes me: "A very delightful *acid* preserve is made from the large drupes of this tree."

Birds are fond of the fruit of this genus.

THYMELACEÆ. (*The Mezereum Tribe.*)

According to Lindley, the great feature of this tribe is the causticity of the bark, which acts upon the skin as a vesicatory and causes excessive pain in the mouth when chewed.

x CANADA LEATHERWOOD; ROPE BARK, (*Dirca palustris*, L.) Diffused; grows near Augusta at Colleton's Neck, (Ell.) Bartram found it near Savannah; N. C. Fl. Feb.

Mér. and de L. Dict. de M. Méd. ii, 659; U. S. Disp. 1253; Coxe's Am. Disp. 259; Shec. Flora Carol. 513; Big. Am. Med. Bot. ii, 157; Barton's Collec. 32; Griffith, Med. Bot. 563; Raf. Med. Fl. i, 158. The berries are said to be narcotic and poisonous, and the bark has a nauseous odor and acrid taste, yielding its virtues to alcohol; eight grains of the powdered bark will produce violent vomiting, followed by purging. When applied to the skin, it blisters like mezereon. The juice has been applied to the nerve of a painful tooth with relief, and in diseases where acrid masticatories are serviceable. Bigelow says the decoction is sudorific and expectorant, and he considers it a good substitute for senega. The bark is also uncommonly tough, and was used by the Indians for cordage; the wood is very hard and pliant.

Its twigs are remarkable for toughness, are as strong and pliable as those of the lime tree, and are employed in America for the manufacture of various small articles Its bark, also, has a homogeneous character with the twigs, and is used for making ropes and baskets; and both, but especially the twigs, occasion the plant to be popularly called in Canada leatherwood. This plant is an excessive favorite with snails! Wilson's Rural Cyc.

LAURACEÆ. (*The Cinnamon Tribe.*)

The qualities of the species of this order are uniform, being universally aromatic, warm and stomachic.

SASSAFRAS, (*Sassafras officinale*, Nees. *Laurus sassafras* of Ell. Sk.) Diffused. Fl. March.

Bell's Pract. Dict. 411; Eberle, Mat. Med. ii, 320; Drayton's View, 68; Ed. and Vav. Mat. Méd. 341; U. S. Disp. 640; Royle, Mat. Med. 518; Pe. Mat. Med. and Therap. ii, 253; Cullen's Mat. Med. ii, 200 and 579; Big. Am. Med. Bot. ii, 142; Murray's Apparat. iv, 835; Kalm's Travels, 11; Hoffman's Obs. Phys. Chem. 31; Clayton's Phil. Trans. viii, 332; Bremaine, "Sassa-

fralogia," in 1627; Woodv. Med. Bot.; Griffith's Med. Bot. 552; Thornton's Fam. Herb. The plant contains an essential oil, obtained by distillation, which is heating, sudorific and diuretic, and which is used to disguise the taste of medicines. In the Supplem. to Dict. de M. Méd. 426, 1846, it is reported that the essential oil, when placed in a temperature of 40° Fahr., will form crystals, which, being exposed to heat, return to pure oil: from the Report in the Lond. Med. Journal vii, 2501, 831; Researches on the Ess. Oil of Sassafras, in the Comptes Rendus Hebd. des Sc. de l'Acad. des Sc. xviii, 705. After the conquest made by the Spaniards in Florida sassafras was used in the treatment of syphilis, the warm infusion being applicable in cutaneous disease, by acting on the emunctories. The root is employed in the Carolinas in combination with guaiac, sarsaparilla, and China briar, (*Smilax*,) in the formation of diet drinks. It is diaphoretic and diuretic, useful in rheumatism, and Alibert speaks highly of it in gout. The pith of the young branches, according to Eberle, contains a great deal of mucilage; which is "an exceedingly good application in acute ophthalmia, and no less useful in catarrhal and dysenteric affections;" it is not affected by alcohol; Griffith (Med. Bot. 552) also speaks favorably of it as an application to inflamed eyes, being effectual in the removal of the irritation so constant in this complaint. It is advantageously given as a demulcent drink in disorders of the respiratory organs, bowels and bladder; being more efficacious than that prepared from the leaves of *Bené*, (*Sesamum Indicum.*) It might be used as a substitute for acacia. The oil extracted from this plant is one of the heaviest of the volatile oils. Dr. B. S. Barton states that it has been found an efficacious application to wens. Coll. i, 19. G. Velsch, "Lignum sassafras et radice diversum," Miscel. Cur. Nat. 332, 1670; C. J. Trew, Brevis Hist. Nat.; Arboris Sassafras dictæ, (Nova acta Acad. Nat. Cur. ii, 271;) G. D. Ebret de Arboribus Sassafras dictis et Londini cultis, (Nova acta ii, 236;) Obs. on the Sassafras, in Obs. sur la Physique, xxiv, 63; Bonastre, Mém. sur l'Huile volatile de Sass. (Journal de Pharm. xiv. 645.) And, also, A. Buchner upon the Crystallization of the Oil of Sassafras.

The roots yield a drab color with copperas; no doubt a much lighter shade may be obtained by alum or vinegar as a mordant. I believe that any of our plants containing either tannin or

colored juices may be used as dyes. Iron increases the shade by forming tannate or gallate of iron. See "*Rhus*," etc.

The leaves of sassafras contain an unusual proportion of mucilage, and two or three leaves, dissolved in water, yield a mucilaginous drink. I made great use of the tea prepared with sassafras root, gathered extemporaneously, while surgeon to the Holcombe Legion, S. C. Vols. It was given whenever a warm, aromatic, mucilaginous tea was required, in fever, pneumonia, bronchitis, catarrhs, mumps, etc. The nurse detailed for each company procured the materials upon the spot where the company or regiment was posted. It served every purpose of the articles usually supplied by the medical purveyors of the army. I have also used it in lieu of gum arabic and flaxseed, so largely required on our plantations. The cotton seed is said to make an equally economical demulcent tea.

In camp sassafras tea was often drunk daily by many of the officers and soldiers as a favorite substitute for green tea. It is thought to purify the blood, but the impression that it tends to impair the health and intellect if persisted in must be erroneous. The oil it contains is diuretic.

The Farmer's Encyclopœdia says of the sassafras:

"The wood stripped of its bark is very durable, strong and resists worms, etc. It forms excellent posts for gates. Bedsteads made of it are never infested with bugs. It is, however, only occasionally employed for any useful purpose, and never found in the lumber-yards of large towns. The pith and dried leaves of the young branches of the sassafras contain much mucilage, resembling that of the okra plant, and are extensively used in New Orleans to thicken pottage, and make the celebrated *gumbo soup*."

A cheap and wholesome *Beer* for the use of soldiers, or as a table beer, is prepared from the sassafras, the ingredients being easily obtained. To eight bottles of water are added one quart of molasses, one pint of yeast, one tablespoonful of ginger, one and a half tablespoonful of cream of tartar, these ingredients being well stirred and mixed in an open vessel; after standing twenty-four hours the beer may be bottled, and used immediately. The reader interested in the manufacture of beer, ale, porter, etc., will find the methods detailed in Solly's Rural Chemistry, Ure's Dictionary of Arts and Manufactures, and in Wilson's Rural Cyclopœdia.

I add the method of preparing

The French Army Beer.—The following is the recipe of the beer that has been introduced into the French Army upon the recommendation of the Medical Board. It is described as a very wholesome beverage, of pleasant and refreshing taste, and promoting digestion in a remarkable degree. It may prove an agreeable beverage both in and outside of the army:

Water	100 litres	about 100 quarts.
Molasses	500 grammes	about 1 pound.
Hops	100 grammes	about 3 ounces.
Marshmallow root	50 grammes	about 1½ ounce.
Yeast	50 grammes	about 1½ ounce.

Make an infusion of the hops and marshmallow root with about twenty times their weight of the boiling water. Another part of the water is used to dilute the molasses, and another to dilute the yeast. All the fluids are then mixed, and put into a vessel for fermentation. After five or six days it will be ready for use.

The following modification of the recipe may sometimes be preferable:

Water	100 litres	100 quarts.
Honey	800 grammes	1 lb. 10 oz.
Brown sugar	800 grammes	1 lb. 10 oz.
Hops	300 grammes	9 oz.
Yeast	50 grammes	1½ oz.

I have no doubt the mucilaginous leaves of the sassafras or the *Benę* would serve as a substitute for the marshmallow. See, also, "Persimmon," (*Diospyros,*) "Apple" and "Hop," in this volume for manufacture of domestic liquors.

SPICE BUSH; FEVER BUSH; WILD ALLSPICE, (*Benzoin odoriferum*, Nees V. Ess. *Laurus benzoin*, L., Ell. Sk.) Grows along rivulets.

Collected in St. John's, Charleston District; Richland; Newbern. Fl. April.

Mér. and de L. Dict de M. Méd. iv, 51; U. S. Disp. 1233; Lind. Nat. Syst. Bot. 201; Griffith's Med. Bot. 553; Barton, 295. This is another of our highly aromatic, indigenous shrubs; the bark is, besides, stimulant and tonic; "extensively used, in North America, in intermittent fevers."

This tree contains a remarkable amount of aromatic property in every portion of it; it yields benzoin. Benzoin is also found in our grasses *Anthoxanthum odoratum*, (sweet scented vernal

grass,) *Holcus odoratus* and *Mellilotus officinalis*—the principle which appears to give fragrance to hay and pasture land, and which is communicated undecomposed to the urine of the cow. Wilson's Rural Cyc. The berries contain an aromatic oil, which is esteemed in some parts of the country as an application to bruises, rheumatic limbs, etc. It is said to have been employed during the Revolutionary war, as a substitute for *allspice*. B. S. Barton states that an infusion of the twigs has been found efficacious as a vermifuge; the flowers are employed in the place of those of the sassafras.

A decoction of the plant forms an excellent diaphoretic drink in pneumonias, colds, coughs, etc., and as such may be largely used among soldiers in service.

The soldiers of the upper country of South Carolina, serving in the Holcombe Legion, of which I was Surgeon, came into camp fully supplied with the spice bush for making a fragrant, aromatic, diaphoretic tea. This, and a tea prepared from the sassafras, I used entirely as a substitute for gum arabic and flaxseed in colds, coughs, pneumonias, etc. Soldiers may supply themselves with these, as they move camp, in any locality.

POND SPICE, (*Laurus*, Walter. *Tetranthera geniculata*, Nees.) Grows around ponds; vicinity of Charleston; Newbern; Fla. This, also, is aromatic. A species growing in China affords much tallow.

ARISTOLOCHIACEÆ. (*The Birthwort Tribe.*)

SERPENTARIA; SNAKEROOT, (*Aristolochia serpentaria*, L.) Diffused. Richland; vicinity of Charleston; Newbern. Fl. June.

Bell's Pract. Dict. Mat. Med. 420; Trous. et Pid. Mat. Méd. i, 336; Ed. and Vav. Mat. Méd. 249; Eberle, Mat. Med. i, 280; Le. Mat. Med. i, 163; Frost's Elems. Mat. Med. 520; Royle, Mat. Med. 532; U. S. Disp. 658; Pe. Mat. Med. and Therap. i, 231; Journal de Pharmacie, vi, 365; Journal de Chim. Méd. vii, 493; Sydenham, Peechey's Trans. 4th edition, 33; Ball and Gar. Mat. Med. 375; Cullen, Mat. Med. ii, 85; Bergii, Mat. Med. ii, 765; Mér. and de L. Dict de M. Méd. i, 415; Big. Am. Med. Bot. iii, 82; Murray, Apparat. Med. i, 348; Chap. Therap. and Mat. Med. ii, 411; Lind. on Hot Climates, 104, 254; Shec. Flora Carol. 203; Lind. Nat. Syst. Bot. 206; Bart. M. Bot. 251; Woodv.

Med. Bot.; Griffith's Med. Bot. 829; Linn. Veg. M. Med. 166; Bull Plantes Vén de France, 83; Thornton's Fam. Herb. This plant, which yields a volatile oil, camphor, malate and phosphate of lime, is well known as a tonic, diuretic and diaphoretic, of great value in the low stages of fever, and in typhus, after remittent, in chlorosis, and in atonic affections of the intestinal canal; indicated where we wish to stimulate and excite at the same time a free diaphoresis and diuresis. It is also useful in promoting the cutaneous excretions in exanthematous diseases, where the eruptions are tardy. Dr. Chapman recommended it in "bilious pleurisy." The infusion is serviceable in restraining vomiting; much use is made of this plant among the negroes in the South, particularly in the low stages of pneumonia, to which they are particularly liable. I have repeatedly observed the good effects of both this and the senega snakeroot, (*Polygala senega*,) in this affection. The dose of the powdered root is ten to thirty grains; of the infusion, of one ounce to one pint of boiling water, two ounces may be taken as often as occasion requires. Its effects are increased by combining it with camphor. Dr. Thornton, (Fam. Herb. *cit. sup.*,) used it in typhus fever; two drachms of the tincture, combined with ten grains of the powder and five drachms of the tincture of opium, may be given every hour. It is said to add much to the efficacy of bark; and it forms an ingredient of Huxam's Tr. of bark.

Several vegetable infusions surpass even sea salt in anti-septic power. Sir John Pringle says that several bitters, such as serpentaria, chamomile, or Peruvian bark, exceed salt, he inferred, one hundred and twenty times—"flesh remaining long untainted when immersed in their infusions; camphor is more powerful than anything else." Wilson's Rural Cyclop. This anti-septic power of certain vegetable substances should be compared with their medicinal effects when prescribed internally. All the articles just mentioned are, it will be remembered, employed in typhoid and low fevers. Among vegetable products, vinegar is also anti-septic, and in the latter stages of low forms of fever, dysentery, etc., is highly useful. Among the astringents possessed of anti-septic properties, the tannin may be the potent agent, on account of its affinity for albumen and gelatine.

Aristolochia hastata. Rich, shaded soils. Fl. June.

U. S. Disp. 658; Am. Journal Pharm. xiv, 121. It is said to be similar in properties to the *A. serpentaria.*

DUTCHMAN'S PIPE, (*Aristolochia sipho.*) Shec. Fl. Carol. 205. Similar in properties to the others.

Aristolochia tomentosa, Sims. Fla. to Mts. of N. C. Similar in properties to the other species.

WILD GINGER; COLT'S FOOT; CANADA SNAKE-ROOT, (*Asarum Canadensis*, L.) Rich soil; collected in St. John's. Fl. April.

U. S. Disp. 125; Pe. Mat. Med. and Therap. ii, 243; Frost's Elems. 220; Med. Journal Pharm. x, 186; Dict. Univ. des Drogues Simples, Ann. 1733; Cullen Mat. Med. ii, 473, 553; Mér. and de L. Dict de M. Méd. i, 463; Big. Am. Med. Bot. i, 149; Schœpf, Mat. Med. 72, in *op. cit.;* Barton's Collection, 26, 48; Coxe, Am. Disp. 368; Lind. Nat. Syst. Bot. 206; Griffith's Med. Bot. 527. An aromatic, stimulant tonic and diaphoretic, "applicable in similar cases with *serpentaria.*" It is employed in cases requiring a medicine of this class, and is used in cholic where no inflammation exists. It is valuable in colds, coughs and female obstructions as a warm, diffusible stimulant and diaphoretic; sometimes combined with snakeroot and puccoon root, (*Sanguinaria.*) Dr. Firth gave it with benefit in the tetanus of children arising from cold. The leaves, dried and powdered, have powerful errhine properties. They were once considered actively emetic, (Shec. Fl. Carol. 219;) but this has been denied by Bigelow and Barton, *op. cit.* Dr. J. R. Black, of Indiana, has ascribed active diuretic properties to it, and has used it with extraordinary success in two cases of dropsy, connected with albuminous urine. He used a decoction made by boiling four ounces of the root in two pints of water for thirty minutes, and gave two tablespoonsful every four hours. N. Y. Journal Med. xxxii, 289; U. S. Disp., 12th Ed. The root is often used as a substitute for ginger, to which it is said to be fully equal. According to Bigelow's examination, it contains a pungent, volatile oil, and a resin which communicate to alcohol the virtues of the plant, fecula, a gum, mucus, etc., *op. cit.* 153, 1. By the Anal. of Mr. Rushton, quoted in Griffith's work from the Am. Journal Pharm. x, 81, and more recently of Mr. Proctor, *ibid*, xii, 177, it is shown that the active principle is an aromatic essential oil, and that it contains neither *asarin* nor camphor.

This plant may be given either in powder, tincture or infusion; dose of the powder, thirty grains. It may be boiled in milk and drunk freely. A syrup may also be made.

HEART SNAKEROOT, (*Asarum Virginicum.*) Grows in rocky soils. Fl. July.

Shec. Flora Carol. 218; Frost's Elems. Mat. Med. 219; "a stimulating diaphoretic, fully equal to the *Arist. Serp.*" Probably possessed of similar properties to the other. Milne, in his Ind. Bot. 73, alludes to this species as one of the strongest of the vegetable errhines—the roots and leaves being used. "The fresh leaves applied to the nostrils speedily terminate attacks of slight cold by the discharge which they induce." Those who snuff find it a valuable addition to tobacco—the dried leaves being powdered and mixed with it. The decoction and infusion of this were considered emetic, and great relief was said to have been afforded by it in periodical headaches, vertigo, etc.; one scruple of the fresh or one drachm of the dried root and leaves was employed as an emetic and cathartic.

Asarum arifolium, Mich. Grows in shaded, rich soils; collected in St. John's Berkeley, near Whitehall Pl.; vicinity of Charleston. Fl. May.

Shec. Flora Carol. 217. This, no doubt, partakes of the properties of the others, if it is not identical; Linnæus proposes it as a substitute for ipecac; and Dr. Cutler says that the powdered root, in moderate doses, acts as a gentle emetic, one and a half drachm given in substance. The "tincture possesses both emetic and cathartic virtues." This, like the former, is a very powerful sternutatory; when the powdered leaves are used, the discharge from the nose will sometimes last for three days, hence it has been applied in this way with great advantage in stubborn disorders of the head, palsies, etc. "A case in which there was paralysis of the mouth and tongue was cured by one application of it."

AMARANTACEÆ. (*The Amaranth Tribe.*)

The leaves of many of the species are wholesome and mucilaginous.

FORTY-KNOT, (*Achyranthes repens*, Ell.) Diffused; grows in the streets of Charleston.

Ell. Bot. Med. Notes, i, 311. It is possessed of well marked

diuretic properties, and is employed in ischury and dysury, and in the gravelly complaints of old persons. In Fairfield District, S. C., it has lately been employed with decided success in several cases of dropsy, but sharing the fate of all other diuretics in being sometimes inefficient in cases depending upon organic changes, or produced by causes other than those connected with the circulation. It is given in decoction—a handful of the herb to a pint of water—of which a wineglassful is taken three times a day. I have used this plant as a diuretic in the City Hospital, Charleston, under my care 1867, and find it to be possessed of decidedly diuretic properties.

SALTWORT, (*Salsola kali.*) Sandy shores; Georgia and northward.

Among the plants used in procuring *soda* in Spain, are "the different species of *Salsola*, *Salicornia*, and *Batis maritima*. The *Zostera maritima* is burnt in some places on the borders of the Baltic. In this country (Scotland, see Thornton's Fam. Herbal.) we burn the various species of *fuci*, and in France they burn the *Chenopodium maritimum*. In order to obtain it the carbonate must be treated like potash of commerce, with lime and ardent spirits as described before." Within the limits of the Southern States we have all the above plants, save *C. maritimum*. Little doubt, however, exists in my mind that our several species of worm seed, (*Chenopodium*,) will be found to contain potash or soda in large amount. Some plants, "which in their native soil yield only potash, afford also soda if they are cultivated in the neighborhood of the sea." "The soda is more or less pure according to the nature of the particular plant from which it is obtained," (Thornton.) The species of *Salicornia* are found on the coast of Florida and northward. *Batis maritima*, L. "Salt marshes, Apalachicola, and northward." *Zostera marina*, L. West Florida and northward. (Chapman's So. Flora.) See "*Sapindus*" and "*Saponaria*," in this volume, p. 159, where the salsola has been treated of in connection with the "soap wort."

Wilson says also of the *Salsola kali* that it is the best of our native plants for yielding "kelp, barilla, potash and soda, and was formerly collected in considerable quantities on our western coasts, and burned to yield soda for the manufacture of glass, and for other purposes. It grows freely from seed, and does

not require any great nicety of management, yet never has been carefully cultivated." Rural Cyc. See, also, "*Fucus*," in this volume, for method of preparing *barilla* and *soda* from sea weeds.

I introduce the following brief process for the manufacture of *soda*, as we have several plants in the Southern States which furnish it: Far the best mode now adopted is to procure it from sea water, but this may not always be attainable. "For the manufacture of soda, the marine plants are gathered at the season when their vegetation has terminated, and they are left to dry. A pit four feet square and three feet deep is dug in the earth; this is heated with split wood, and the saline plants are afterward thrown gradually in. Combustion is continued during seven or eight days; the ashes become fused in the pit, and remain in this state till the end of the process, when the combustion is completed; the whole is allowed to cool, and then the block of soda is divided into large pieces for the market." "In order that soda may possess all the requisite strength, it is necessary to separate it from the carbonic acid with which it is always united, and by which its properties are weakened. This is easily done by mixing quick-lime with a solution of soda; the acid has so strong an affinity for lime as to quit the soda to combine with it. The lye procured from this mixture is caustic, and leaves a burning impression upon the tongue; the soda thus purified acts more readily upon the bodies with which it combines. This mode of preparation is indispensable when soda is to be employed with oil in the manufacture of hard soap; it is useless when it is to be combined at a strong heat with earthy bodies, as is the case in glass works." Chaptal also copies from M. DeSaussure's Treatise on Vegetation a very extensive table, giving the constituents of a great many plants, trees, etc., which the reader may consult. Among the plants used in preparing soda on the Mediterranean are the *Salicornia Europea*, the *Salsola tragus*, the *Statice limonium*, the *Atriplex portulacoides*, the *Salsola kali*. We have growing in South Carolina and Georgia the *Salsola kali*, and the *Statice Carolinana*, Walt., which should be tested, the *Atriplex hastata*, and the two species of *Salicornia*, mentioned above, which also grow on our coast. To show the alliance of the natural families in physical resemblances and natural properties, I find *Chenopodium*, *Atriplex*, *Salicornia* and

Salsola all in one tribe, and each rich in potash or soda. The fumitory (*Fumaria*) is one of the plants richer in potash than the wormwood, (*Chenopodium.*)

GLASSWORT, (*Salicornia herbacea*, L.) Salt marshes along the coast of Georgia and Carolina.

We have two species of this genus, which is celebrated, commercially, for the production of alkaline salts. Wilson states of *S. herbacea* that the whole plant abounds in saline juices, and possesses a saline taste; and that it was formerly burned in common with the richly alkaline fuci in the manufacture of kelp; that it is greedily eaten by sheep and cattle, and that it is sometimes gathered and used as a substitute for rock samphire in Scotland. See "*Salsola.*"

CHENOPODIACEÆ. (*The Goose-foot Tribe.*)

Some are wholesome, others possess an essential oil, which is tonic and anti-spasmodic. The beet and spinach, cultivated in the Southern States, belong to this order.

JAGGED SEA-ORACH, (*Atriplex laciniata*, L.) Grows along salt streams. Fl. July.

Shec. Flora Carol. 247. The expressed juice, in doses of four to eight grains, is said to act as a powerful purgative. According to Schœpf, it is used as a substitute for gamboge in dropsy and asthma.

JERUSALEM OAK; WORMSEED, (*Chenopodium anthelminticum*, L.) Diffused; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Linnæus, Veg. M. Med.; Pe. Mat. Med. and Therap. ii, 274; Eberle, Mat. Med. 218; Ell. Bot. i, 331; Chap. Therap. and Mat. Med. ii, 71; Drayton's View of South Carolina, 65; Frost's Elems. Mat. Met. 191; U. S. Disp. 206; Bart. M. Bot. ii, 183; Am. Journal Pharm. v, 180; Bergii, Mat. Med. i, 183; Griffith's Med. Bot. 538. It is well known as "one of our most efficient indigenous anthelmintics," adapted to the expulsion of lumbrici in children. Eberle employed the oil of the seeds with success in these cases, after every other remedy had failed. The dose to a child under five years is two drops; to an adult thirty drops, given on sugar grated in water. The expressed juice may be used, or a decoction of the leaves in milk, a wineglassful at a dose, for the oil impregnates the whole plant. The dose of the

seed, for a child two years old, is from one to two scruples, mixed with syrup or bruised in castor oil. The distilled water may also be used. These plants are much employed on the plantations in South Carolina and Georgia for their anthelmintic properties, the seeds being collected in the fall. Dr. Wood states that the plant is cultivated in Maryland.

The wormwood, (*Artemisia*,) of which there is a species (*A. caudata*) growing in West Florida and northward, is said to be rich in potash. This plant should also be examined for the active principle *santonine*, and for an essential oil. The *Chenopodium*, of which we have several species, although not belonging to the same natural family, is perhaps equally rich in potash. The "wormwood is highly recommended to be converted into charcoal, to be used in the manufacture of gunpowder." See "*Salix*." In fact, all the *Chenopodiums* are also rich in alkaline salts, potash, etc., and may be used for its manufacture. The Persian insect powder, a species of *Pyrethrum*, (or Persian chamomile,) destroys insects with great certainty. I think it likely that some of the plants just mentioned, the milfoil, (*Achillea millefolium*,) the tansy, (*Tanacetum vulgare*,) or ox-eye daisy, (*Leucanthemum vulgare*, L.,) all growing in the Southern States, may possibly be found to answer the purpose of destroying insects, caterpillars, etc., on plants and animals. They contain a pungent oil. There is a notice of the *Pyrethrum* (*roseum*, *purpureum* and *carneum*) in Patent Office Reports, 1857, 129.

See, also, *Dasistoma* for plant hostile to insects.

I have several times stated that the allied *Artemisia*, wormwood, was exceedingly rich in potash. The natural affinities are here borne out, for the family *Chenipodiaceæ* contains many plants furnishing *soda* in large proportion. Such are *Salsola*, *Salicornia*, *Atriplex* and salt-marsh *Chenopodiums;* a notice of species of all these genera is included in this volume. They should receive the attention of the nitre manufacturers. Nitrate of potash "is found in the common horseradish, in the nettle, and the sunflower." Farmer's Encyc.

JERUSALEM OAK OF SOME, (*Chenopodium botrys*, Ph.) Grows near Columbia. Fl. August.

U. S. Disp. 206; Le. Mat. Med. 235; Ed. and Vav. Mat. Méd. 304; Bergii, Mat. Med. i, 181; Mér. and de L. Dict. de M. Méd. ii, 225; Shec. Flora. Carol. 388; Dém. Élém. de Bot. 250. The

juice of this is also carminative, pectoral, emmenagogue and vermifuge; the essential oil is anti-spasmodic, tonic and vermifuge. An infusion, as a tea, is resolutive and expectorant, and is useful in flatulent colic, spasmodic cough, humoral asthma, and in hysteria. The expressed juice of this species is given in doses of a tablespoonful, in molasses, to children affected with worms, or the seeds are reduced to a powder, and made into an electuary with syrup. See Milne, Ind. Bot. 76; Linn. Veg. M. Med. 41. "It is asserted," observes Shec. Flora. Carol. 389, "that the whole seeds produce worms in the stomach, and if a parcel be baked in a loaf of bread they will generate worms. Such is the belief; what credit may be due to it, I leave to the determination of those who either have, or may hereafter, put it to the trial!"

Chenopodium ambrosioides, Ph. Vicinity of Charleston; grows in Georgia, according to Pursh; Newbern. Fl. July.

Lind. Nat. Syst, Bot. The essential oil of this is also tonic and anti-spasmodic. U. S. Disp. 206. Plenk reports five cases of chorea cured by the infusion made with two drachms to one ounce of water, of which a cup full is to be taken morning and night. Mér. and de L. Dict. de M. Méd. ii, 222. M. Mack used it, with equal success, in the hospital at Vienna, in this and in other nervous affections; see, also, the supplement to the work last mentioned, 1846, p. 165. It is employed by M. Martius in the "injection of the mucous membrane of the lungs." MM. Rilliet and Barthez used it in the chorea of infants particularly. Ann. des Sci. Nat. xii, 220; Bouchardat, Ann. de Thérap. 1844; Gazette de Méd. de Saltzburg, Bill Med. xii, 516. It is found, by chemical analysis, to possess various products, the most important of which are gluten and a volatile oil. Bull. des Sc. Méd. de Férus, vii, 225. The infusion emits a very strong, aromatic odor, and is used in parts of this country in the place of tea.

LAMB'S QUARTER, (*Chenopodium album*, L.) Richland; vicinity of Charleston; N. C.

Mér. and de L. Dict. de M. Méd. ii, 223; Phys. Med. Trans., Calcutta, ii, 40. It is a sedative and diuretic; used in hemorrhoids. Chevallier remarks the singular fact that the *C. vulvaria*, a foreign species, exhales pure *ammonia* during its whole existence. This is the only observation on record of a gaseous

exhalation of azote by perfect vegetables, and the facility with which this principle is abandoned by ammonia may, perhaps, explain the presence of azotic products in the vegetable kingdom. Ann. des Sci. Nat. i, 444; Lind. Nat. Syst. Bot. 209. It might be interesting to observe whether anything of this kind takes place in our species.

The above was printed by me in 1849. Worm-seed plant is said to be very rich in potash—and wormwood has been planted for the manufacture of glass—if so, the note on the subject of the *C. vulvaria* exhaling ammonia is corroborated by the above observation. I have learned, June, 1862, that an enterprise was set on foot several years since near Columbia, S. C., to cultivate the wormwood on a large scale for the production of potash. See "Poke weed." The sugar-maple is very rich in potash, probably the other maples also. See *Salsola*, *Quercus*, *Zea*, *Phytolacca*, etc., in this volume. The young shoots of the Lamb's quarter have been used for making soup.

SANTALACEÆ.

OIL NUT, (*Pyrularia oleifera*, Gray. *Hamiltonia oleifera*, Muhl.) Mts. Ga. and northward.

The nut of this plant affords a great deal of oil, which should be examined.

PHYTOLACCACEÆ. (*The Virginia Poke Tribe.*)

POKE WEED; JEW POKE, (*Phytolacca decandra*, L.) Diffused in rich spots; Newbern. Fl. July.

U. S. Disp. 537; Big. Am. Med. Bot. 135; Bell's Pract. Dict. 355; Bart. M. Bot. ii, 213; Am. Journal Pharm. xv, 169; Murray's App. Med. iv, 335; Kalm, Travels in N. Am. p. 197; Graffenreid, Mem. Berne, iii, 185; Schœpf, M. Med. 71; Browne, Hist. Jamaica, 232; Amæn. Acad. iv; Miller's Dict., art. Phyt. Dec.; Sprogel, Diss. Cirven. 24; Beckman, Com. 1764, 9; Allioni, Flora Ped. ii, 132; Franklin's Works, i; Cutler, Mem. Am. Acad. i, 447; Rush, i, 259; Thacher's U. S. Disp. 300; Shultz's Inaug. Diss. N. Am. Journal, vi; Journal de Méd. de Corvisart Leroux, xvi, 137; Ann. de Chim. lxii, 71; Mér. and de L. Dict. de M. Méd. v, 298; Coxe, Am. Dis. 486; Lind. Nat. Syst. Bot. 210. The juice of the leaves or berries, inspissated in the sun

to the consistence of an extract, will, it is said, discuss hard tumors if applied to the part, "and destroy cancers by eating them out by the roots!" (Am. Herbal. by J. Stearns.) Mixed with brandy, it is extolled in the cure of rheumatism, easing pain and producing discharge of the cutaneous and urinary secretions. One ounce of the dried root infused in a pint of wine is said to act kindly as an emetic, in doses of two table-spoonsful. Bigelow also was of the opinion that it resembled ipecacuanha in its mode of operation; but later experimenters give an unfavorable report, as it is sometimes uncertain, acting too powerfully by accumulation. The pulverized root is also emetic in doses of one to two drachms. "The tincture of the ripe berries seems to have acquired a well-founded reputation as a remedy in chronic and syphilitic rheumatism, and for allaying syphilitic pains." By some thought to be more useful than guaiac. The decoction has been used in scrofula also. A spirit distilled from the berries killed a dog in a few moments by its violent emetic effect; and, according to De Candolle, it is a powerful purgative. The French and Portuguese mixed it with their wine, to give it color, and this was prohibited by royal ordinance of Louis XIV, "on pain of death, as it injured the flavor!" Lind. Nat. Syst. Bot. 210; Mér. and de L. Dict. de M. Méd. states that two spoonsful of the juice of the old plant, which is acrid, will purge violently; applied externally, it will irritate the skin, and it is used in the cure of sanious ulcers, cutaneous eruptions, itch and hemorrhoids; for the latter affection, an infusion is injected per rectum. Drs. Jones and Kollock, of Georgia, assure us (adds Mérat) that they cure syphilis with it, in all its stages, without the use of mercury. Dr. Minge, of Norfolk, Va., I am informed, has found a tincture very beneficial in secondary syphilis, made with an ounce of the bruised root added to a pint of equal parts of whiskey and water—a dessert spoonful of which is given three times a day and gradually increased. Dr. Rush relates that several students of Yale College were severely purged from eating the flesh of pigeons which had fed on the berries. From the analysis in Annal. de Chimie, lxii, 71, it is shown to contain an enormous quantity of potash, 42 in 100 parts, and it is proposed to cultivate it for the manufacture of this article. From later examinations of Dr. E. Donnelly, (Am. Jour. Pharm. ix, 168,) it appears to contain gum

resin 262, starch 20, potash 2, a small quantity of fixed oil and 66.5 of woody fibre. According to the U. S. Disp., it is also somewhat narcotic, and, as an emetic, is considered very slow in its operation, sometimes not acting for several hours, and then frequently upon the bowels; but the vomiting produced by it is not attended with pain or spasm. In over doses, its effects are quite dangerous. As an alterative, the dose is from one to five grains; as an emetic, ten to thirty grains of the powdered root. Dr. Griffith has also used it with success in syphilitic rheumatism. (Med. Bot. 535.) In the supplement to the Dict. Univ. de M. Méd. 1846, 557, it is said to have been used with good effect in paralysis of the intestines. Précis des Travaux de l'Acad. de Rouen, 188, 1838; Comptes Rendus Hebdom. des Sci. iv, 12, January, 1837. The ointment, prepared by mixing one drachm of the powdered root or leaves with one ounce of lard, has been applied with advantage in diseases affecting the scalp, as psora, tinea capitis, etc. Dr. Bigelow was successful with it, and Dr. Haynard cured cases in which sulphur had failed. A gentleman informs me that he has frequently seen the sores of secondary syphilis heal up by the application of a strong decoction of the roots. Dr. Braconnot considers the yellow liquor produced by the juice of the berries one of the most delicate tests of the presence of acids. Dr. Shultz procured from a half bushel of the berries six pints of spirits, sufficiently strong to take fire and burn with readiness; if this is correct, it might be used as a local application in place of alcohol. The root of the plant should be dug in autumn, sliced, dried and kept in close-stopped bottles.

Dr. J. H. Claiborne, of Petersburg, Va., reports in the Confederate S. Med. J. March, 1864, the successful use in camp itch of a decoction of this plant and the Broom sedge or broom straw, (Eupatorium?) He uses the strong decoction of the former as a bath, followed by the application of soap and water. If it causes pain the decoction of the broom straw is substituted. He has also used the saturated tincture of the berries of *P. decandra* in teaspoonful doses, three times a day, as a laxative and alterative.

Dr. R. Moore, of Sumter District, S. C., informs me that the berries of the poke in alcohol or whiskey, a dessert spoonful repeatedly given, has been found one of the most efficient remedies

1878. 10 drops Fluid Extr used ten in dec 1x dry ap milk - see also Paper on subject in ... Moore of Camden. very much used in ... T.P.P.

we possess in rheumatism. Dr. Ballard, of the same district, has used it with satisfactory results for fifty years. It is very generally employed in this way by many. The root is commonly used, applied externally, to cure mange in dogs. The root should be dug late in autumn, or during the winter, and the powder kept in close-stopped bottles, as it deteriorates.

A friend in Powhattan County, Va., informs me that they use the decoction of the poke root applied externally to cure fistulæ, and sores often occurring on the legs of horses which are very difficult to heal. The following was very generally used in the hog cholera which prevailed so extensively during the years '63-4: "Equal proportions of pine tops and poke root boiled down to a strong tea. A tablespoonful of copperas and a half pint of salt are added to every five gallons of the tea given internally." Dr. C. S. Fenner has found it highly useful as an internal remedy in granular conjunctivitis, especially in preventing the relapses to which the affection is so liable. A saturated tincture of thé berries may be given in rheumatic cases in the doses of a fluid drachm three times a day. Dr. Fenner uses a saturated decoction, of which he gives a wineglassful every two or three hours. Dr. H. E. Carey, of Ohio, has cured three cases of sycosis and one of favus by the local use of a decoction of the root. (Va. Med. Journal, Aug., 1856,) U. S. Disp. See Stethoscope March, 1856, for case of poisoning caused in a woman by eating a double handful of the berries. There was free purgation followed by coma and prostration—death did not result until after the sixth day.

An excellent *crimson dye* is thus prepared, (Thornton's So. Gardener:) to two gallons of the juice of pokeberries, when they are quite ripe, add half a gallon of strong vinegar made of the wild crab-apple, (ordinary vinegar will do, as the writer has seen,) to dye one pound of wool, which must be washed very clean with hard soap; the wool when wrung dry is to be put into the vinegar and pokeberry juice and simmered in a copper vessel for one hour, then take out the wool and let it drip awhile, and spread it in the sun. The vessel must be free from grease of any kind.

The writer has seen articles dyed successfully with this plant. The "Solferino" color is obtained from it; see p. 218. With alum to fix the color, I have used the juice of the pokeberry as

a red ink. The directions to the printer for this volume were written with this; before adding alum I found that the red color was fugitive. The berries boiled with sugar for a few minutes so as not to burn, with the addition of a little alcohol and alum, make an excellent red ink and may also be used to color custards, creams, etc. The young shoots of the poke are often used as a spinach.

The juice of the leaf of the garden *Tanya* makes an *indelible* dark brown dye. I would suggest that the addition of nitrate of silver, sulphate of iron, or alum would make an indelible ink for marking linen.

POLYGONACEÆ. (*The Buckwheat Tribe.*)

The leaves and roots are generally acrid and agreeable.

DOCK, (*Rumex crispus*, L.) Grows around buildings; diffused; collected in St. John's; Newbern. Fl. June.

Ell. Bot. 414; U. S. Disp. 606. The decoction is astringent, alterative and tonic, uniting a laxative power with these, and resembling rhubarb in its mode of operation. It has been used with success as an alterative in itch and syphilis; the powdered root with milk, or as an ointment, or the expressed juice is applied externally in scabies, ring-worm and in eruptive diseases.

Dr. N. S. Davis, "is satisfied from his experiments and observations that the chief value of dockroot" consists in its alterative and gently laxative qualities, no doubt on account of the saline constituents of this genus. As an alterative he esteems it to be "fully equal to the far-famed sarsaparilla." It might prove a useful drink in scrofulous habits.

Dr. J. H. Salisbury has published a paper upon this plant N. Y. J. Med., March, 1855. The petioles contain nearly one per cent. of oxalic acid. The root yields its virtues to water and alcohol, but is injured by long boiling. U. S. Disp.

It is recommended as a dentrifice, especially where the gums are spongy.

It is supposed that our species possess all the virtues of the officinal; two ounces of the fresh root, or one ounce of the dried may be boiled in a pint of water, of which two ounces can be taken at a dose.

SORREL; SHEEP'S SORREL, (*Rumex acetosella*, Walt. Flora Carol.) Abundant in sandy pastures; collected in St. John's; Richland; Newbern. Fl. June.

U. S. Disp. 605; Pe. Mat. Med. ii, 279; Ed. and Vav. Mat. Méd. 536; Bergii, Mat. Med. i, 300; Griffith Med. Bot. 546. This is also considered one of the most valuable of the species. It is refrigerant and diuretic, and is employed as an article of diet in scorbutic complaints; the young shoots may be eaten as a salad; but it is said to prove injurious in large quantities, on account of the oxalic acid existing in it. The bruised plant is often applied to sores, and it is thought to be very active in allaying inflammation—doubtless owing to its saline constituents.

Plants containing Vegetable Acids.—The acids vary during the several stages of vegetation—these are the oxalic, citric, malic, tartaric, gallic, acetic, Prussic, etc. Oxalic acid has been found by M. Deyeux free in the hulls of the chickpea, and it has been extracted from the expressed juice of the plant; also found in the stalks and leaves of sorrel, and in the juice of all the varieties of rhubarb, (Chaptal.) It is used in detecting the presence of lime, and its power of dissolving rapidly the oxide of iron makes it useful in *stamping cotton cloths.* "In this process the whole fabric is covered with a mordant of iron, which is afterward removed by means of this acid combined with gum—so that the color applied adheres firmly only to those parts where the mordant has not been destroyed." It is also used in removing ink spots from cloth. When under the tuition of M. Robin, in Paris, I have frequently examined the peculiar crystals in the several plants put under the microscope.

The astringency of the root of the dock is due to tannic acid, and the acidulousness of the leaves to tartaric acid and the binoxalate of potash. This is almost destroyed by drying.

Wilson observes of the *Rumex acetosa*, the "common dock" of England, which is closely related to our *R. acetosella*, that it has been celebrated from very ancient times for its cooling, antiscorbutic, diuretic and gratefully esculent properties. The expressed juice of its leaves, or a decoction of them in whey, affords a useful drink in cases of inflammatory fever, and the leaves themselves, eaten freely as a salad, cool the blood, and act as either a cure or a preventive of scurvy. It is also much used as a salad, and as a season for soups, broths, etc. Rural Cyc. Now that we know the composition of the juices of the sorrel we can well understand to what to ascribe its cooling and diuretic properties. There is an Italian proverb which says

that the "sorrel always grows with the thistle"—the leaves of the first being particularly grateful when applied over parts irritated by the stings of the last. Our plant is not so useful as the English one.

Mills, in his Statistics of S. C., states of the narrow leaved dock "that the roots give to cloth, previously bleached, from a straw to a pretty fine olive and deep green color. The salt of lemon is prepared from the juice of the sorrel, dock or common sorrel.

COMMON DOCK, (*Rumex obtusifolius*, L. *Rumex divaricatus*, Ell.) Diffused; around buildings; introduced.

"A decoction of its root is highly efficacious in obstinate cases of the kind of skin diseases called ichthyosis, and when taken in large quantity—as well, indeed, as the decoction of any of the fusiform dockroots—it acts as a purgative, in the same manner as the powder or the tincture of Turkey rhubarb." Wilson's Rural Cyc. According to Riegel, this plant contains a peculiar principle called *rumicin*. The leaves of most of the species are edible when young, and are occasionally used as spinach. They are somewhat laxative, and form an excellent diet in scorbutic cases. U. S. Disp. Our various species of *Rumex* may, upon examination, be found to be capable of supplying the place of cathartics, when difficult to be obtained.

DRAGON'S BLOOD, (*Rumex sanguineus*, Walt.) Flora Carol. Grows around Charleston; Newbern. Fl. July.

Dém. Élem. de Bot. 240. The root is astringent, stomachic and eccoprotic. Linn. Veg. Mat. Med. 65. This and the seeds are used in dysentery and in wounds; referred to in Mér. and de L. Dict. de M. Méd. vi, 136, as a mild astringent. Journal de Méd. xxiii, 415. Dr. Wood, in the U. S. Disp. 606, says that it may be used indiscriminately with the officinal.

Rumex Britannicus, Walt. Swamps and along streams. Fl. May. U. S. Disp. 606.

P. persicaria, L. Introduced. Fla. and northward. The leaves are very acrid and pungent, and will vesicate the skin when applied in a fresh state. It was considered by eminent authorities to be an admirable astringent, vulnerary and febrifuge; and Baglivi states that it is a specific in diseases of the kidneys and bladder—seldom prescribed. Griffith. The flowers and flower

tops may be used for tanning. See M. Dussauce's Treatise on Tanning, 1867.

WATERPEPPER; SMARTWEED; BITING KNOTWEED, (*Polygonum hydropiperoides*, Mx. *Polygonum mite*, Ph.) Grows in damp, rich soils; collected in St. John's, where it grows abundantly, observed in Charleston; Richland; Newbern. Fl. July. The *P. acre* of Kunth is *P. punctatum* of Ell. Sk.

Eb. Mat. Med i, 441; U. S. Disp. 559; Ed. and Vav. Mat. Méd. 128; Le. Mat. Med. ii, 193; Ogier, in So. Journal Med. and Pharm. 1846; Mér. and de L. Dict. de M. Méd. v, 433. In the Bull. Plantes Vén. de France, 140, the young leaves are said to ease the pain of gout, and the decoction is used with great success for dissipating old ulcers. Dém. Élem. de Bot. iii, 267. The expressed juice is an excellent diuretic and is applied to putrid ulcers; "*aqua hujus stillatitia efficax est ad comminuendum calculum etiam vesicæ.*" See Ray's Catalogus Plantarum, 230. This plant is, however, more remarkable for its power in amenorrhœa. Eberle asserts that he employed it in twenty cases, and was never more successful. Dr. Ogier, of Charleston, S. C., has published cases in the journal alluded to above, confirming its value. One to two ounces of the strong infusion are given two or three times a day, or a tincture may be used. The juice of this plant is very acrid and caustic to the taste, and it is said to blister the skin. A friend informs me that he has repeatedly found an ointment made with the leaves give immediate relief when applied to piles in an irritable and painful condition. Dr. Wilcox, of Elmira, N. Y., reports in the Am. J. Med. Sc. N. S. xvi, 248, that he derived advantage from using a decoction of the dried leaves, made in the proportion of an ounce to the pint, and applied locally in mercurial salivation and the sore mouth of nursing children. U. S. Disp., 12th Ed. It is stated in the Flora Scotica, 207, that it is found a convenient and useful application for driving off flies from wounds, occurring on cattle for instance; the decoction will dye a yellow color. Linn. Veg. Mat. Med. 71; Boyle, de Util. Philosoph. Nat. pt. ii, 69. This plant should be selected with care, as it differs but slightly from the *P. mite* and others, which possess no value. It may be distinguished by its burning taste, by the sharp, pellucid leaves and simple flower-stalk, with the stamens and pistil of

equal length. The stipules are long, truncated and fringed, with the margin and midrib of the leaves slightly scabrous.

A writer from Manchester, S. C., 1862, recommends the use of this plant in camp dysentery, thus: "Draw a strong tea and use instead of water, with or without sugar, hot or cold, as the patient may prefer. It may be drunk freely, having no unpleasant effect. It may be gathered and dried in the shade or used fresh. I am informed that this plant stupefies fish.

KNOTGRASS, (*Polygonum aviculare*, L.) Diffused; grows in pastures and yards; Richland; collected in St. John's; observed in the streets of Charleston; Newbern. Fl. July.

Lind. Nat. Syst. 211; Mér. and de L. Dict. de M. Méd. v, 440; U. S. Disp. 558. According to the Encyclopœdia the root is powerfully astringent, and is used in diarrhœa and in uterine hemorrhage. Dém. de Bot. iii, 268; Linn. Veg. M. Méd. 72; Am. Herbal. 164. It is stated in the Supplem. to the Dict. de M. Méd. 1846, 578, that Dr. Bourgoies announced, in 1840, that this plant was an excellent febrifuge, and was used in middle Africa and Algeria as a substitute for quinine, and furthermore, that the assertion was not doubted. Dr. Levat. Perroton, of Lyons, gives it as an excellent remedy for chronic diarrhœa, using a strong decoction for a month or more; he reports nine cases cured which had resisted other plans of treatment. See Révue Médicale, Nov., 1845; Flor. Méd. ii, 107. It has also been administered in hematemesis. This plant had some reputation in these diseases in former times. It was said to be emetic and purgative, useful in hernia, and in arresting the vomiting of blood, and was regarded as an excellent vulnerary in moderating fluxes, diarrhœa and dysentery. Griffith, in his Med. Bot. 546, observes that the emetic property so unusual in this genus is thought by De Candole to reside in the testa. Thunberg, in his "Voyage," mentions that in Japan they obtain a color from it similar to that from indigo. As the leaves of *P. hispidum* are said by Humboldt to be substituted in S. America for tobacco, the leaves of some of our species should be tested with this view.

Polygonum polygama, Vent. and Malt. *Polygonum parvifolia*, Mx. Grows in sandy pine barrens; Richland District.

Big. Am. Med. Bot. iii, 129; U. S. Disp. 558. In small doses it

is tonic; in large laxative and diaphoretic. Bigelow says the infusion is useful in imparting tone to the digestive organs.

Polygonum convolvulus and *scandens*, L. Grow in dry soil and pastures; collected in St. John's; vicinity of Charleston. Fl. August.

Griffith's Med. Bot. 547. "The seeds closely resemble buckwheat, and may be substituted for them."

BUCKWHEAT, (*Polygonum fagopyrum.*) Cultivated in the Southern States.

RHUBARB, (*Rheum palmatum* and *emodii.*) Ex.

I insert this plant and *Beta* here, I hope correctly, being unable at this time to assure myself of their place in the Natural system. The cultivation of rhubarb, rosemary, sage, rue, chamomile and many other medicinal plants, is briefly described in the Patent Office Reports, 1854. See, also, seven articles in the "Bath papers, vol. 1," giving an account of the mode of culture in England. The superiority of foreign rhubarb is by some ascribed to a better mode of drying. Rural Cyc. See a paper translated by E. G. Smith, in Patent Office Reports, 1848, p. 604, for varieties, mode of cultivation and relative value, also, medical authors.

In Patent Office Reports, 1855, p. 25, is an article on the cultivation of the medicinal rhubarb, (*R. palmatum.*) "In the middle and cooler parts of the United States the seeds may be sown in March in a gentle hot-bed, and when the roots are an eighth of an inch in diameter they may be carefully drawn up, preserving the tap-root, and planted in a fine, rich and deep soil," etc., etc. In the Middle and Southern States, if planted in the spring, they thrive in the open air. They should be shaded from very hot weather, and continually watered. They are, however, injured by a superabundance of moisture. In the month of August, or before, the seed-stalks should be cut off, which ought always to be done on the withering of the radical leaves and the crowns of the plants should then be covered with mould in the form of a hillock. The largest specimens of this drug have generally been allowed to grow six or seven years. The roots are then very large, sometimes weighing from thirty to fifty pounds. The Chinese take up their rhubarb in winter, as they then contain the entire juice and virtue of the plant. They are

cut transversely into pieces of moderate size, and this should not be delayed. These are then placed on long tables or boards, and turned three or four times a day, in order that the yellow, viscid juice may incorporate with the substance of the root. They are then hung up to dry, exposed to the air and wind, but sheltered from the sun. Thus in about two months the roots are completely cured. Much loss in weight occurs in drying.

Those interested in the culture of rhubarb will find an excellent account of the success with which it was raised in England, of good quality, in Thornton's Family Herbal. Consult Pereira's Materia Medica, and other treatises on the subject. The importation of rhubarb into the Confederate States during the war was enormous, and it commanded a very high price. The greatest difference exists in the quality of the roots. Turkey rhubarb imported from Russia is the best. I will state in passing that the Report for 1855 also contains notices of the best mode of cultivating many other medicinal plants—such as the rhatany, gall-nut oak, Iceland moss, liquorice, quassia, senna, gum arabic, etc.

BEET; MANGEL-WURZEL, (*Beta vulgaris.*) Introduced.

Vinegar having been quite important to us in the recent war, I inserted the following method which will enable us to supply the place of imported vinegar: The juice of one bushel of beet, which is easily obtained, will make from five to six gallons of vinegar, equal to the best made of elder wine. Wash and grate the beets and express the juice in a cheese-press, or in any other way which a little ingenuity can suggest; put the liquor into a barrel, cover the bung with gauze and set it in the sun and in fifteen or twenty days it will be fit for use. The best vinegar is thus made. Boston Cultivator. The saccharine matter of course soon takes on the acid fermentation. So the ripe fig, the skins, etc., added to vinegar, increases largely the amount, and large quantities can thus be easily made with the refuse or over-ripe figs, which are ready to be converted into vinegar. The juice of the watermelon can no doubt be as easily converted into vinegar or boiled down into a syrup like molasses.

The following is the ordinary process of extracting *Sugar* from the beet: the roots are reduced to a pulp by pressing them between two rough cylinders. The pulp is then put into

bags, and the sap it contains is pressed out. The liquor is then boiled, and the saccharine matter precipitated by quick-lime. The liquor is now poured off, and to the residuum is added a solution of sulphuric acid, and again boiled. The lime united with the acid is got rid of by straining, and the liquor is then gently evaporated, or left to granulate slowly, after which it is ready for undergoing the common process of refining raw sugars. The French manufacturers have acquired so much experience, adds Wilson, that from every one hundred pounds of beet they extract twelve pounds of sugar in the short space of twelve hours.

The Silesian or white beet is said to be the most profitable. The reader interested in preparation of sugar from cane or beet may consult Boussingault's Rural Chemistry, Law's Ed. 123, 1857, Ure's Dict. of Arts and Manufactures, Wilson's Rural Cyclopœdia, and Chaptal's Chemistry applied to Agriculture. In France the same land from which the beet has been cut is planted in wheat with advantage to the latter.

As the cultivation of the beet may be undertaken at no distant day, I insert this brief plan by a correspondent of the Southern Field and Fireside: I will give you my plan of planting and culture of beets. In the first place I have my ground broken up deeply; then I have the ground covered over with stable manure; have it plowed in tolerably deep; level the ground with a hoe or rake; hen-house manure is scattered over the ground; hoe it in deep with a grubbing-hoe; level it again; lay off the rows eighteen inches apart, and the hills one foot apart; and then they will grow without any trouble. In cultivating them I have the grass and weeds cut up between the rows. I have raised beets on the above plan that weighed five and six pounds apiece.

It has been observed that beets containing sugar frequently underwent a change during winter, by which the sugar entirely disappeared, and "was replaced by *saltpetre*." Chaptal.

SEA-GRAPE, (*Coccoloba uvifera*, Jacq.) South Florida, along the coast. Chapman. This and *C. Floridana* furnish an astringent gum resin similar to kino, called Jamaica Kino. M. Dussauce, in his "Treatise on the Arts of Tanning, Currying and Leather Dressing," Philada. and London, 1867, states that the *S. American*. Caraccas or Columbia kino is derived from

this plant which also grows in S. America. The juices or sap of the beet, maple and oak also afford tannin.

C. Floridana also grows in Florida. The fruit of some, though very astringent, is eaten by the natives; and the wood of the tallest and bulkiest is used as timber. Wilson's Rural Cyc.

MENISPERMACEÆ. (*The Cocculus Tribe.*)

MOON-SEED; YELLOW PARILLA; YELLOW SARSAPARILLA, (*Menispermum Canadense*, L.) Ell. never saw it, but *thinks* that it grows in the mountains. Dr. Gray determines a specimen sent from St. John's, Charleston District, by H. W. Ravenel, Esq., to be this. Fl. July.

U. S. Disp. 1275. It is said to be much used in Virginia by physicians; and in domestic practice, as a substitute for sarsaparilla, in scrofulous and cutaneous affections. Ryddel, in his Synops. West. States, says that the roots are tonic, alterative and diuretic. Griffith, Med. Bot. 103. It is also employed by the vegetable practitioners. See Howard's Imp. Syst. Bot. Med. 334. Said to be laxative and tonic, and used in debility and in giving tone to the stomach and nervous system. It is closely allied to Columbo. Mr. Maisch has determined that *berberina* and a colorless alkaloid are among its constituents. Am. J. Pharm., July, 1863; U. S. Disp., 12th Ed.

PYROLACEÆ. (*The Winter-green Tribe.*)

SPOTTED WINTER-GREEN, (*Chimaphila maculata*, Pursh; *Pyrola maculata*, Linn.) Shaded soils; diffused; collected in St. John's; vicinity of Charleston; Newbern.

Chap. Therap. and Mat. Med. i, 313; Eberle, Mat. Med. ii, 321; Ell. Bot. Med. Notes, 505; Eat. Man. Bot. 240; Bell's Pract. Dict. 128; Mitchell's Inaug. Thesis, 1803; Ed. and Vav. Mat. Méd. 320; Po. Mat. Med. and Therap. ii, 380; U. S. Disp. 208; Bart. Collec. ii, 21; Lind. Nat. Syst. Bot. 219; U. S. Disp. 207; Frost's Elems. Mat. Med. 281. See *C. umbellata*. "Every part of the plant is possessed of considerable activity;" and it is very valuable as a diuretic in dropsy. See Mitchell's Thesis, and Dr. Summerville's paper in Lond. Med. Chirurg. Trans. vol. v. It is particularly useful in those cases attended with disordered digestion and general debility, for in these its tonic prop-

erties and general acceptability to the stomach prove highly useful auxiliaries to its diuretic powers. It has been successfully administered in ascites, in dysuria and ischuria, gravel, stangury, hæmaturia, acute rheumatism, and in various intermittent disorders. The Indians considered it of universal efficacy; but employed it particularly in nephritic, scrofulous and rheumatic disorders. Dr. Wood, in the U. S. Disp., states that it does prove of benefit in obstinate, ill-conditioned ulcers, and cutaneous eruptions supposed to be connected with a strumous diathesis: used both internally and locally as a wash. The decoction and watery extract are employed. A popular prejudice has existed against this plant; it has received the name of poison pipsissewa; and Mitchell considered it inert; but its resemblance to the winter-green, Griffith thinks, should make us question the correctness of this opinion.

In times of war when there is need for tonics and diuretics, in dropsy, or swelling following low and protracted fevers among our soldiers, no plant will be found more serviceable than the pipsissewa. It is aromatic, tonic and diuretic. It can be easily collected in shady woods, in almost every part of our Southern country.

The black alder (*Alnus serrulata*) is also an astringent diuretic. The catkins or flowerets, dissolved in whiskey, is a domestic remedy in South Carolina—relied on by many, Dr. R. Moore informs me, in gonorrhœa in place of *copaiba*. Pills of pine gum are given together with it.

PIPSISSEWA; WINTER-GREEN; GROUND HOLLY, (*Chimaphila umbellata*, Nutt.) North Carolina and northward.

Both the *C. umbellata* and *maculata* are used. Dr. Thompson says of the *P. umbellata:* "It is diuretic and tonic. It has been given successfully in ascites, after digitalis and other diuretics had failed; and has also proved serviceable in acute rheumatism and intermittents. It produces an agreeable sensation in the stomach soon after it is swallowed; increases the appetite, and acts powerfully on the kidneys." The whole plant is decocted.

One of these plants may be used extemporaneously among troops for its combined tonic and diuretic properties, associated with astringency. Its uses consequently are obvious in the convalescence from fevers. It can be found in high woods near

almost every locality where a regiment is pitched. See "*Eupatorium*," "Persimmon," "Dogwood," etc.

In a pamphlet issued from the Surgeon-General's office it is stated that the *C. maculata* "is not to be gathered, as it is inferior." The decoction of either plant is made with the bruised herb one ounce, water three half pints; boil to one pint; one pint to be given in the twenty-four hours, in divided doses. Pereira refers to both species as being useful.

The decoction has been much used in scrofula. I have found the pipsissewa particularly serviceable as a tonic diuretic in the convalescence from scarlet fever, having used it largely in an epidemic which prevailed among a large number of negroes, (1862.) They were treated with chlorate of potash, Tincture of Bark and Mur. Tinct. of Iron, followed by the decoction of the plant with tincture of bark as a stimulant. I have also found it to act most beneficially in that pallid, anæmic, quasi dropsical state, particularly as it occurs in delicate children after they have passed through an attack of malarial fever—where this condition is met with in those with the strumous diathesis this plant will be found to act remarkably well. This plant has also been employed as a substitute for uva ursi. See Chemical Analysis in Journ. of Med. Coll. Pharm. March, 1860. Prof. Proctor prepares a syrup and he suggests a fluid extract. See U. S. Disp., 12th Ed.

Pyrola rotundifolia. Grows in South Carolina. See *Chimaphila*.

MONOTROPACEÆ.

FIT-ROOT, (*Monotropa uniflora*.) Grows in roads; attached to roots; collected in St. John's; Newbern.

This is used by the steam practitioners. See Howard's Impr. Syst. Bot. Med. 339.

ERICACEÆ. (*The Heath Tribe.*)

Generally astringent and diuretic.

Andromeda mariana, L. Dry soils. Richland; vicinity of Charleston. Fl. May and July.

U. S. Disp. 1238; Mér and de L. Dict de M. Méd. i, 289; Coxe, Am. Disp. 84; Shec. Flora Carol. 156. It is employed in domestic practice; a remedy for herpes. The decoction is used

as a stimulating wash for ulcers and ground itch, to which negroes are liable. The honey which bees extract from this is slightly poisonous. See Nicholson's Journal, 163.

TETTER BUSH, (*Andromeda nitida*, Walt.) Grows in damp, pine land, bogs; collected in St. John's; vicinity of Charleston; N. C. Fl. April.

Ell. Bot. Med. Notes, i, 483. A decoction of the leaves of this also is used in the cure of itch. The young branches, deprived of their pith, form good pipe-stems, see *Cliftonia;* and the bark, with copperas, yields a purple dye. Upon examination I find that the leaves contain a great deal of tannin. See "*Liquidambar*," sweet-gum, for detail of experiments.

SOUR-WOOD; SORREL TREE, (*Andromeda arborea*, L. *Oxydendron arboreum*, D. C.) Diffused; grows in upper districts, S. and N. C. I collected it in St. John's, and Spartanburg District, S. C.

U. S. Disp. 1227. The leaves, when chewed, allay thirst. A decoction of the bark and leaves is also given as a tonic.

Leucothea acuminata, *Andromeda acuminata*. Fla. Black Swamp, S. C.; very ornamental.

Dr. J. H. Mellichamp, of Blufton, writes me: "This is the true 'Ti-ti.' The best pipe stems are made from this shrub." See *Cliftonia*.

Andromeda speciosa, Mich. Vicinity of Charleston. Bach.

U. S. Disp. 1228. It is said to be a powerful errhine. Mr. Curtis in his catalogue applies the name "pepper bush" to *A. ligustrina*.

Andromeda angustifolia, Ph. Vicinity of Charleston.

Griffith, Med. Bot. 223. This and the *A. mariana* are said to be poisonous to sheep. These should be examined for narcotic properties.

WHITE ALDER, (*Clethra alnifolia*, L. *C. tomentosa*, *Lam.*) Abundant in wet pine lands and swamps throughout the Southern States.

Upon careful examination with reagents of the leaves of the plant, I find tannin in great amount. I recommend it with the leaves of sweet-gum, myrtle, etc., as a substitute for oak bark in tanning leather. See "*Liquidambar*" for detail of experiments.

TRAILING ARBUTUS; GROUND LAUREL; MAYFLOWER, (*Epigœa repens*, L.) Fla. and northward. Chap.

The flowers are fragrant. Dr. Darlington (Flora Cestr.) states that the plant has been supposed to be injurious to cattle when eaten by them. Dr. Eli Ives, of Connecticut, furnishes Dr. Wood with the following account: It has been freely used for some years in diseases of the urinary organs and of the pelvic viscera generally, particularly of irritated action in cases in which the uva ursi and buchu are indicated. The leaves and stems are administered in the same doses. It has given relief where the others have failed. U. S. Disp., 12th Ed. Prof. Gross in his work on the urinary organs, p. 172, ascribes the same properties to this plant. He says: "The best form of exhibition is a strong decoction prepared with one ounce of the dried leaves to a pint of water, of which a large wineglassful may be taken every three or four hours."

SPICY WINTER-GREEN; PARTRIDGE-BERRY; MOUNTAIN-BERRY, (*Gaultheria procumbens*, Ph.) Grows in the mountains of South and North Carolina, Dr. MacBride; Newbern. Fl. May.

U. S. Disp. 345; Big. Am. Med. Bot. ii, 29; Lind. Nat. Syst. Bot. 221; Bart. M. Bot. i, 178; Kalm, Amœn. Acad. iii, 14; Bart. Collec. i, 19; Raf. Med. Fl. i, 202; Griffith Med. Bot. 425. The whole plant is aromatic. It possesses stimulant aromatic properties, united with astringency; hence used with advantage in some forms of chronic dysentery. It is said to have also some anodyne power. The infusion of the leaves has been found beneficial in amenorrhœa attended with debility, and in promoting the mammary secretion when deficient. In the Revolutionary war it was used as a substitute for tea. The berries, which are aromatic and pleasant, are employed to flavor spirituous liquors. An infusion of them in brandy is a convenient and useful substitute for the ordinary bitters. An essential oil is obtained from the leaves by distillation. From Mr. Proctor's examination (Am. Journal Pharm. viii, 211; and ix, 241,) it is shown to possess acid properties, and to have the same composition as the salicylate of methylene. It is one of the heaviest of the essential oils, having a specific gravity 1.173, with a burning, aromatic taste, mixing with alcohol or ether in all proportions. This is [illegible] in the *Betula lenta*, some of the *Spiræas*, [illegible] in the *Poly-* [illegible] etc. It is applied with good effect to diminish the [illegible] of nerves affected by carious teeth, and to disguise the smell of nauseous medicines.

MOUNTAIN LAUREL; WILD ROSEBAY, (*Rhododendron maximum*, L.) Grows among the mountains. Fl. July.

Lind. Nat. Syst. Bot. 221. "It is well known to be possessed of poisonous properties." Mér. and de L. Dict. de M. Méd. vi, 75 Employed with success in chronic rheumatism, gout, and glandular enlargements. The petioles act as a sternutatory. Coxe, Am. Disp. 526; Big. Am. Med. Bot. iii, 103. It is a resinous astringent, the leaves containing tannin; but its supposed poisonous, narcotic power is doubted by some, as Bigelow swallowed an entire leaf, and no bad effects resulted. B. S. Barton, however, in his Collections, i, 18, says it is certainly poisonous. The brown powder attached to the foot-stalks possesses considerable power as an errhine. The purple variety, one of the most beautiful, grows in South Carolina.

A writer under the signature of "Cunio," communicates the following to the "Atlanta Commonwealth," 1861:

"*Wood for Engraving.*—Upon the authority of Mr. Charles Foster, long known as a wood engraver at Nashville, Tennessee, many years since, I can state that the wood of the *R. maximum*, or mountain laurel, as well as its *confrère*, *Kalmia latifolia*, known by every farmer as poison ivy, are equalled only by the best boxwood, the former of which abounds on every mountain from Mason and Dixon's line to North Georgia that has a rocky branch."* I had reported the *K. latifolia* in my Sketch of the Medical Botany of South Carolina, as "possessing a wood much used for mechanical purposes, being hard and dense." See *Amelanchier* for substitutes for boxwood, which is costly.

Rhododendron punctatum, L. and Ph. Grows at the head branches of rivers in South Carolina and Georgia; "Tugoloo branches of the Savannah." Fl. July.

Mér. and de L. Dict. de M. Méd. vi, 75; Griffith, Med. Bot. 428. A stimulant and astringent. Michaux says it furnishes to bees a deleterious honey.

CALICO BUSH; IVY BUSH, (*Kalmia latifolia*, L.) Grows along rivers in upper districts; S. and N. C.; Richland, Gibbes; at Sister's Ferry; Savannah River; Aiken, S. C. Fl. July.

Drayton's View of South Carolina, 69; Ell. Bot. i, 481; U. S. Disp. 1269; Big. Am. Med. Bot. i, 133; Kalm's Travels, i, 335; Barton's Coll. i, 18, 48; and ii, 26; Thacher's Disp. 247; Thomas' Inaug. Diss., Raf. ii, 16; Griffith, Med. Bot. 528. The

leaves are poisonous and narcotic, and animals have been poisoned by eating them. It is said that death has been occasioned by eating the flesh of partridges and pheasants that had fed on them. Dr. Shoemaker publishes two cases, (see N. Am. Med. and Surg. Journal, see U. S. Disp.,) which resulted from eating a pheasant, in the craw of which laurel leaves were found. The symptoms are nausea, temporary blindness, pain in the head, dyspnœa, cold extremities and a very feeble pulse, which in one case was for some time absent at the wrist; in the other, beat only forty strokes in the minute. In both cases relief was afforded by vomiting produced by a tablespoonful of flour of mustard mixed with warm water. A case of similar poisoning is related in the Edinburgh Med. J., May, 1856, in which epigastric tension and uneasiness, glowing heat of the head, loss of sight, coldness of the extremities, general prostration and twitchings of the muscles were the prominent symptoms, followed by nausea and full vomiting, which afforded some relief. But feelings of formication and weakness of the limbs, with great prostration of the circulation, remained for several hours requiring the use of stimulants. See U. S. Disp., 12th Ed.

Thomas, in Inaug. Diss. Phil. 1802, reports cases of obstinate diarrhœa cured by a decoction, thirty drops being taken four times a day. The leaves have been advantageously used in syphilis, and extensively applied in tinea, psora and cutaneous affections. Dr. Barton states that nervous symptoms have resulted from the external use of the strong decoction, thirty drops taken internally six times a day producing vertigo. Dr. Bigelow detected in the leaves tannin, a resinous matter and gum. Besides these, Dr. Stabler finds a volatile oil of a narcotic odor and nauseous smell, supposed to be the active principle: see Am. Journal of Pharm. x, 241; Griffith, Med. Bot. 428. From these experiments of Dr. S. he determines it to be a direct arterial sedative, without any acrid or narcotic property; hence he supposes it suitable to cases of hypertrophy of heart and other diseases, when it is necessary to decrease the action of that organ; and from the tannin present that it is peculiarly fitted for cases of hemorrhage, dysentery, etc. He proposes that two ounces of the leaves be macerated in a pint of alcohol for a week and then strained, the dose of which for an adult is thirty drops every two or three hours. If these observations

are confirmed it will give the plant a high reputation as a sedative, and attention is invited to it. The wood is much used for mechanical purposes, being hard and dense.

Kalmia hirsuta, Walt. Grows in wet pine barrens; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, i, 483. The leaves are used by negroes, and the poor white people, as a cure for itch, and for the mange in dogs. A strong decoction is applied warm to the eruptions, which occasions much smarting; and it seldom requires more than one application to effect a cure.

SHEEP LAUREL, (*Kalmia angustifolia*, L.) Barren hills; upper districts N. and S. C. Chapman.

The leaves of the *Kalmia* (*angustifolia?*) exude a sweet, honey-like juice, which is said when swallowed to bring on a mental intoxication both formidable in its symptoms and long in its duration, (Torrey.) In this it appears closely to resemble the *Armenian azalea*, (Johnston's Chemistry of Common Life, vol. ii, p. 157.) About Long Island the *K. angustifolia* is believed to kill sheep, and is known by the name of sheep poison. The *Azalea pontica*, a kindred shrub, is said to be the source of the narcotic quality for which the Trebizond honey is famous.

VACCINACEÆ. (*The Bilberry Tribe.*)

Bark and leaves are astringent, slightly tonic and stimulating

AMERICAN CRANBERRY, (*Vaccinium macrocarpon*, Ait. *Oxycoccos*.) Grows in swamps of North Carolina and northward.

The cranberry, useful for their ascescent, cooling properties, for making pies, etc., are now exported to Europe, and they are said to bring eight dollars a bushel in the London market, as they are easily transported without suffering from the voyage. They are cultivated on boggy or swampy land, sand being thrown over it to kill the grass. There is a communication in the Patent Office Reports, 1857, on the mode of cultivation of the plant. Cranberries may be preserved perfect for several years merely by drying them a little in the sun, and then putting them up closely in clean bottles. They also keep well in fresh water. The red-fruited variety yields a juice which has been employed to stain paper or linen purple.

FARCLE-BERRY; SPARKLEBERRY, (*Vaccinium arboreum*, Marsh.) Grows in damp soils; diffused; collected in St. John's; vicinity of Charleston; N. C. Fl. May.

Ell. Bot. Med. Notes, i, 496; Griffith Med. Bot. 431. The bark of the root is very stringent, and is employed in diarrhœa and bowel complaints. The leaves also are astringent, and a decoction, as tea, is given in diarrhœa and dysentery, and as a wash in sore mouth; the fruit is more palatable and equally as efficacious. The bark is also used for tanning. The root and bark are very much used as an astringent in Sumter District, S. C., given in the form of tea to children affected with diarrhœa from teething, simply because it contains tannin, I suppose, like the chinquapin, oak bark, etc. It is very much relied upon. The root is sometimes stewed in milk and given the same way. Most of the species possess qualities similar to this one. Some of those at the South bear fruit which are very pleasant to the taste, and commonly known as huckleberries. I regard the wood as uncommonly hard and close.

A *cordial* is made from "Whirtleberries," says a writer, 1863; "to one quart of berries add half a pint of water, boil until tender and strain. To one quart of juice add half a pint of brandy. It must be well sweetened with loaf sugar."

PRIMULACEÆ. (*The Primrose Tribe.*)

More remarkable for beauty and fragrance than for their sensible properties.

RED CHICKWEED; SCARLET PIMPERNEL, (*Anagallis arvensis*, L.) Nat. on Sullivan's Island. Collected in St. John's; N. C. Fl. July.

U. S. Disp. 1227; Le. Mat. Med. i, 80; Mér. and de L. Dict. de M. Méd. i, 276; Orfila, Toxicologie, ii, 275; Woodv. Med. Bot. Mém. Acad. Royal de Méd. 18 Mars. ann. 1226. The flowers close at the approach of rain, and occasions the plant to be called the "poor-man's weather-glass." Rural Cyc.

This plant enjoyed great reputation at one time, and was said to possess sudorific, vulnerary, anti-epilectic and anti-hydrophobic virtues. Woodville states that it is acrid and poisonous. It was considered very valuable for the bite of serpents, but more particularly in hydrophobia, given in the form of powder

in doses of two drachms. See the reports to the Econ. Soc., Berne; Dém. Élém. de Bot. ii, 124. Milne, in his Ind. Bot. 260, asserts that it was frequently successful even after dangerous symptoms had supervened; and the great Hoffman yielded to this opinion. It "really possesses highly energetic powers, for Orfila destroyed a dog by making him drink three drachms of the extract." Lind. Nat. Syst. Bot. 224. It is used as a local application in ill-conditioned ulcers, and internally in visceral obstructions, dropsy, epilepsy and mania. Mr. J. A. Heinzelman obtained a small quantity of volatile oil from the dried herb, four drops of which produced intense headache and nausea, which continued for twenty-four hours with pains throughout the body. U. S. Disp., 12th Ed.

BROOKWEED, (*Samolus valerandi*, L.) Vicinity of Charleston; grows in morasses; collected in St. John's, Charleston District. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 201; Journal Gén. de Med. lii, 413; Dém. Élém. de Bot. ii, 121. Lemery says it is an antiscorbutic, aperient and vulnerary.

SAPOTACEÆ. (*The Sapotilla Tribe.*)

IRONWOOD, (*Bumelia lycioides*, Ell. Sk.) Vicinity of Charleston; very rare in St. John's Berkeley; N. C. Fl. June.

Griffith Med. Bot. 441. The bark is said to be austere, and to be useful in bowel complaints. The tree is classed by some, with the persimmon, under the "ebony tribe"—the wood being characterized by great density and hardness.

Mimusops Sieberi, A. Dc. S. Fla. Chap.

This tree or shrub should be examined. The East Indian species yield a gum from the bark and an oil from the seeds, the latter used in painting and in facilitating parturition.

EBENACEÆ. (*The Ebony Tribe.*)

Wood generally hard and black.

PERSIMMON, (*Diospyros Virginiana.*) Diffused; grows abundantly in both upper and lower districts. Fl. March.

Coxe, Am. Disp. 259; U. S. Disp. 302; Ed. and Vav. Mat. Méd. 135; Am. Journal Med. Sc., N. S. iv, 297; Mér. and de L. Dict. de M. Méd. ii, 657; Ann. Chim. de Montp. xxiv, 247; Shec. Flora Carol. 510; Lind. Nat. Syst. Bot. 227; Griffith Med. Bot.

436. An astringent and styptic. The inner bark is used in intermittent fever, in diarrhœa, and with alum as a gargle in ulcerated sore throat. The powdered bark can be used wherever an astringent is required. The unripe fruit is exceedingly astringent; employed while fresh, or dried in the sun and powdered, it is very valuable in diarrhœa, chronic dysentery and uterine hemorrhage. It forms a convenient and useful prescription for those residing in the country, made into pills or in the shape of a spirituous tincture. Mr. B. Smith found that the green fruit contained tannin, sugar, malic acid, and woody fibre; the first disappears and the others increase as it ripens. (Am. Journal Pharm. xii, 157.) The juice, in the unripe state, is said to be preferable to oak bark for tanning; and a black dye may be extracted from it. The fruit, when matured, is very sweet and pleasant to the taste and yields on distillation after fermentation a quantity of spirits; a beer is made of it, and mixed with flour, a pleasant bread. I have used the wood for engraving. Every tree of slow growth seems to me have a dense and hard wood, because the rings are close together, though the consistence of the interspaces varies in different plants. See "*Amelanchier.*" Persimmon bark with iron yields a dye, the color depending on the mordant used. See "*Rhus;*" also Treatises on Calico printing and on Dyeing, Ure's Dict. of Arts and Manufactures and Wilson's Rural Cyc. Processes are there described. Upon testing for tannin the leaves of the persimmon I find very little, but a great deal in the unripe fruit. See detail of experiments under sweet-gum, "*Liquidambar.*" The tannic acid in the unripe fruit has been ascertained by Mr. J. E. Bryan, (Am. J. Ph. xxxii, 215,) not to be of the kind existing in galls and oak bark. The fact that tannin is a glucoside, observes Dr. Wood, may throw some light on the rapid and complete change which the fruit undergoes from astringency to sweetness during maturation. U. S. Disp., 12th Ed. Dr. Mettaner used the infus. syrup and vinous tincture of the bruised unripe fruit in diarrhœa, chronic dysentery and uterine hemorrhage. U. S. Disp.

A variety of persimmons are occasionally met with in Sumter District, S. C., with fruit almost twice the ordinary size. They were found near Claremont and the river. I have known of a large fruited variety from Cooper River also. Ale can be made with the different species of gentian also, and in England they

use *G. lutea* and *purpurea* as substitutes for hops. The persimmon should be used in camps as an astringent. See "*Castanea.*"

To Make Persimmon Beer.—Gather the persimmons perfectly ripe and free from any roughness. Work them into large loaves with bran enough to make them consistent; bake them so thoroughly that the cake may be brown and dry throughout, but not burned. They are then fit for use. But if you keep them any time it will be necessary to dry them frequently in an oven moderately warm. Of these loaves broken into a coarse powder, take eight bushels. Pour on them forty gallons of cold water, and after two or three days draw it off; boil it as other beer, adding a little hops. This makes a very strong beer. See Thornton's Southern Gardener, p. 138. W. Gilmore Simms, Esq., writes me word that the persimmon beer manufactured in Orangeburg District, S. C., by the Hon. J. M. Felder, equalled the best sparkling "Jersey Champagne." The latter is generally made of apples, and is a species of carbonated cider. See "Apples," "Hops," "Sassafras," for method of manufacturing useful liquors.

The following is from the Southern Cultivator and was published during the war:

Persimmon Beer.—The best persimmons ripen soft and sweet, having a clear, thin, transparent skin, without any rough taste. Most animals fatten on them; the chicken, duck, turkey, goose, dog, hog, sheep and cow all eat them greedily. The fruit, when mashed and strained through a coarse wire sieve, makes delightful bread, pies and pudding. When kneaded with wheat bran, and well baked in an oven, the bread may be put away for winter use in making beer, and used when wanted.

The following is one of the very best receipts for making the beer: Sweet ripe persimmons, mashed and strained, one bushel; wheat bran, one half bushel. Mix well together and bake in loaves of convenient size; break them in a clean barrel, and add twelve gallons of water and two or three ounces of hops. Keep the barrel in a warm room. As soon as fermentation subsides, bottle off the beer, having good long corks, and place the bottles in a low temperature, and it will keep and improve for twelve months. This beer, when properly made, in a warm room, is an exquisitely delightful beverage, containing no alcohol, and is to

the connoisseur of temperate taste not inferior to the fermented juice of the vine.

The ordinary way of making it is more simple, and the drink is relished heartily by most persons: a layer of straw is put in the bottom of the cask, on which a sufficient quantity of fruit, well mashed, is laid, and the cask then filled with water. It should stand in a warm room, and if the weather is cold, fermentation will be promoted by occasionally putting a warm brick or stone in the barrel. The addition of a few honey locusts, roasted sweet potatoes, or apple peelings, will make the beer more brisk. Wheat bran always improves the quality.

A syrup made with unripe persimmons boiled in sugar is recommended as a portable and useful astringent to be used by soldiers in camp to prevent dysenteries and diarrhœas. I append the following which appeared during the war in the journals of the day:

"We find in an old magazine an account of an experiment in distilling brandy from persimmons, which may be interesting. The writer prepared the persimmons in the same way as peaches are usually prepared for the still, and the result of the experiment was an average of one gallon of proof spirits, of an agreeable flavor, for each bushel of the persimmons."

Palatable syrup is made of the persimmon. The persimmons are mixed with wheat bran, baked in pones, next crushed and put in vessels, water poured on, and all allowed to stand twelve hours. Strain and boil to the consistency of molasses.

A writer says: "I have been using persimmon syrup for ten years past, for dysentery, and am persuaded that it has no equal as a remedy for that troublesome disease. It is a simple, harmless and effective astringent. It is made of persimmons before they are quite ripe. They should be mashed up, put into boiling water, and then strained through a coarse cloth. This rough juice may be preserved in sugar or syrup. If soldiers in camp would adopt this remedy, many long cases of chronic dysentery might be prevented."

The ripe fruit of the persimmon, May-apples, figs, etc., are also useful with a basis of molasses or honey in making vinegar.

A good vinegar, very much like, and equal to, white wine vinegar, is made as follows:

Three bushels of ripe persimmons, three gallons of whiskey,

and twenty-seven gallons of water. To those who can get the persimmons, the vinegar thus produced will be relatively cheap, even at any price which the most elastic conscience can ask for the spirits.

Indelible Ink.—Green persimmons, say twelve of them, mash them, pour on water enough to cover them. Boil over a slow fire but not too much, add in a small piece of copperas. This ink will not change color and cannot be washed or rubbed out. The bloom of the persimmon and chinquapin is said to be destructive to hogs.

SWEET-LEAF, (*Hopea tinctoria*, L.) Diffused; grows sparingly in the low country; vicinity of Charleston, collected in St. John's Berkeley; Ward swamp; Newbern. Fl. May.

Griffith Med. Bot. 437. The root is esteemed a valuable stomachic. Ell. Bot. Med. Notes, ii, 177. Its leaves afford a yellow dye; they are sweet and pleasant to the taste, and are eaten by cattle. Major J. Le Conte informs me that the leaves and root are much used in Georgia, in syphilitic and scrofulous affections.

Mills, in his Statistics of South Carolina, states that Captain Felder, of Orangeburg, S. C., procured a paste from this plant, and those of the yellow Indigo, "a species of Cassia," for which he obtained one guinea per pound during the Revolutionary war Dr. Edward Jenkins informs me that he has used a decoction of the root in diseases of the kidney, with advantage. It appears to possess a narcotic property, and is serviceable in painful and irritable conditions, where the renal organs are involved.

This does not seem to be the genus *Hopea* belonging to the order *Dipteraceæ*, which furnishes such valuable resins.

STYRACACEÆ. (*Styrax Tribe.*)

Styrax. Several species grow in the Southern States, but none are medicinal, so far as I can ascertain. It is well known that storax and benzoin are furnished by some of them.

Symplocos tinctoria, L'Her. Low woods and banks of streams. Florida to North Carolina and westward. (Chap.)

The dyer's or laurel-leaved species, under the name of yellow wood or sweet-leaf, is used for yielding a yellow dye. Rural Cyc. See "Hopea."

AQUIFOLIACEÆ. (*The Holly Tribe.*)

These are generally astringent.

BLACK ALDER; WINTER-BERRY, (*Ilex verticillata*, Gray. *Prinos verticillatus*, L.) Damp soils. Fl. May.

U. S. Disp. 874; Wild Spec. Plantarum, 275; Mér. and de L. Dict. de M. Méd. v, 15; Barton's Med. Bot. i, 203. The berries and bark are tonic and astringent, and are used in intermittent fevers, diarrhœas, and diseases connected with a debilitated state of the system, especially gangrene and mortification. It is a popular remedy in ill-conditioned ulcers, chronic cutaneous diseases, administered internally and locally as a wash. Lind. Nat. Syst. Bot. 229. "The bark and berries possess in an eminent degree the properties of the vegetable astringents and tonics, combined with anti-septic powers highly spoken of." They are extensively prescribed in some parts of the country in diarrhœa, and as a corroborant in dropsy. The leaves are employed as a substitute for tea. The plant was used by the Indians. It may be taken in substance, in doses of thirty grains to a drachm, to be repeated, or a decoction made with two ounces of the bark to three pints of water, of which three ounces may be taken several times a day. A saturated tincture of the bark and berries has also been used. Bigelow did not speak highly of this plant, but W. P. C. Barton extols it and recommends it to the profession, having employed it on several occasions. Dr. Meara, in the Phil. Med. Museum; Griffith Med. Bot. 434; Coxe's Am. Disp. 500.

INKBERRY, (*Ilex glaber*, Gray. *Prinos glaber*, L.) Grows in damp soils, along bays; Richland District; collected in St. John's. Fl. May.

Lind. Nat. Syst. Bot. 229; Mér. and de L. Dict. de M. Méd. vi, 53. The leaves are employed as a tea. The plant probably possesses properties similar to those of the other. Upon chemical examination I find very little tannin in the leaves. See sweet-gum (*Liquidambar*) for detail of experiments. I am informed that the "*Ilex*, or *Prinos glaber*," was much used in Wilmington, N. C., during the war in cases of intermittent fever.

HOLLY, (*Ilex opaca*, L.) Diffused; in rich soils; Newbern. Fl. May.

Griffith Med. Bot. 432; U. S. Disp. 1263. I am informed by

gentlemen who have used this plant that the decoction of the bark of the root has been found very serviceable as a demulcent in colds, coughs and incipient phthisis; and by Dr. Joseph Johnson, of Charleston, that the berries are serviceable as an emetic. The bark of the holly root chewed is a most excellent demulcent and tonic for chronic colds and coughs, as I have frequently experienced in my own case and in that of a number of my friends who rely upon it greatly in these cases. It has a pleasant bitter taste, improves the appetite and promotes expectoration. It is asserted by some to possess properties fully equal to those of the *I. aquifolium* of Europe, the inner bark of which also yields a viscid substance called *birdlime;* its leaves are esteemed as a diaphoretic in the form of infusion; employed in catarrh, pleurisy, small-pox, etc. Its febrifuge virtues are supposed to depend on a bitter principle, *illicin*, and the berries are considered purgative, diuretic and emetic. The good effects resulting from the use of this plant in diseases affecting the mucous passages, may be owing to the substances contained in the inner bark. Some declare that they find it fully as efficient in intermittent fevers as the Peruvian bark. As an emetic, the berries are said to be more active than the leaves. Dr. Tully says, Mat. Med. p. 1368, that he has been informed that it has a high popular reputation in South Carolina as an ecbolic, it being considered capable of producing an abortion or miscarriage at any stage of pregnancy. A strong infusion or decoction of the leaves is employed, and this is drank freely.

Birdlime can be made from holly and misletoe; also from elder. The bark and juice are used. See process described in Ure's Dictionary of Arts and Manufactures, article "Birdlime." The leaves of this plant, like *I. dahoon* and *I. cassina* are used as substitutes for green tea. See *Ilex cassina*.

I condense the following from Wilson's Rural Cyc.:

"Birdlime for catching birds, mice and other vermin, is generally made from the middle bark of the holly, which is boiled in water seven or eight hours, till it becomes soft and tender. After the water has been strained off it is laid in masses in the earth, covered with stones, and left to ferment during a fortnight or three weeks. When thus changed into a kind of mucilage it is taken from the pit, pounded in mortars until reduced to a paste, washed and kneaded in river water until freed from

all extraneous matter. It is left in earthen vessels four or five days to purify itself by fermentation, and it is then put up for use or commerce. In every kingdom or district there is a different mode of preparing this substance. The mode employed by M. Bouillon Lagrange is to take a sufficient quantity of the second bark of the green prickly holly, to bruise it well, and boil it in water four or five hours; to pour off the water, to deposit the bark in pits in earthen pans, to moisten it from time to time with a little water, to let it remain until it becomes viscous, and to cleanse it by washing when it has attained a proper degree of fermentation."

Birdlime may be procured from the young shoots of the common elder tree, from a number of plants, from slugs, snails, and from the pods of certain caterpillars. The common kind of birdlime readily loses its tenacious quality when long exposed to the air, and particularly when subjected to moisture; but it may be rendered capable of sustaining the action of water by the following process: take a pound of common birdlime and wash it thoroughly with spring water till its hardness be destroyed; then pound it completely that its water may be entirely separated, and when it is well dried put it into an earthen pot with as much goose or capon's grease as will make it run. Add two spoonsful of strong vinegar, one of oil, and a small quantity of Venice turpentine, and let the whole boil for a few moments over a moderate fire, stirring it all the time. It is then ready for use; and this is the only kind that can be successfully used for snipes and other birds which frequent wet situations. When birdlime is to be applied for use it should be made hot, and the rods or twigs should be warmed a little before they are dipped in it. When straws or cords are to be limed it should be very hot, and after they are prepared they should be kept in a leather bag till used. In order to prevent birdlime from being congealed by cold it should be mixed with a little oil of petroleum; and, indeed, before the common kind can be used at all it must be melted over the fire with a third part of nut-oil or any thin grease, if that has not been added in the preparation. It has been found to resemble gluten in many particulars, but differs from it essentially in the acetous acid which it contains; in being very slightly animalized; in the mucilage and extractive matter which may be obtained from it; in the great quantity

of resin which it yields by means of nitric acrid, and in its solubility in ether. See, also, Wilson's article on "Bird-catching" for the various methods of ensnaring game. See "Viscus" in this volume.

Our *Ilex opaca* is said to resemble closely the English holly, (*I. aquifolium.*) It has a hard, white wood, with a fine grain. Among many trees and plants which I have examined, with a view to testing their relative hardness, I do not rank the holly so high as others. The English holly is said by Wilson to be very retentive of its sap, which renders it very liable to warp unless well dried; to be susceptible of a high degree of polish, which renders it well adapted to many purposes in the arts. It readily takes a durable color of any shade, hence used by cabinet-makers, in forming what are technically called "strings and borders" in ornamental works. When properly stained black, its color and lustre are little inferior to ebony. It may be turned to a great number of purposes by turners, engineers, cabinet-makers, philosophical instrument-makers and others. Next to boxwood, the pear tree is the best wood, says Wilson, for engraving upon, as it is compact and stands the tool well. Rural Cyc. I do not think that I found our *I. opaca* equal to the dogwood for the purposes of the engraver; certainly when green it yielded to the graver's tools more readily and was not so hard.

The berries of the English holly are said to be purgative, and six or eight of them swallowed will produce violent vomiting; the bark is said to be febrifugal. *Op. cit.*

YAUPON; CASSINA; EMETIC-HOLLY, (*Ilex cassine*, L. *Ilex vomitoria*, L. and Ait.) Grows near the seacoast; Newbern. Fl. March.

Mér and de L. Dict. de M. Méd. iii, 591; see *I. vomitoria.* Linn. Veg. Mat. Med.; U. S. Disp. 1263, App.; Griffith Med. Bot.; Ell. Sk. of Bot. of South Carolina, ii, 682. The leaves act as a powerful diuretic, and are employed in calculous, nephritic diseases, diabetes, gout and small-pox. This plant is said also to act as a mild emetic. (Mér. and de L.) The Indians used the cold infusion, which was called the *black drink*, and which was said to enliven them, in the place of opium. The Creeks employed it, according to Elliott, at the opening of their councils, sending to the seacoast for a supply. They considered it one of their most

powerful diuretics. (Bart. Coll. 38.) The inhabitants of North Carolina purify brackish water by boiling in it *Cassina* leaves.

In North and South Carolina much use is made of the leaves of cassina for making tea. I would refer the reader to the *Ceanothus Americana*, New Jersey tea tree. The leaves of the common holly (*Ilex opaca*) are also recommended by some as a substitute for tea; and I would call attention to the fact that the famous plant used so extensively in Paraguay, *Maté* or Paraguay tea, is an *Ilex* (*I. Paraguaiensis*) plants of which have been introduced by Lieut. Page, and distributed. See a notice of it in Patent Office Reports, 1854, p. 34, and 1859, p. 15. *Maté* is universally drunk in many of the South American States, and almost fabulous properties are attributed to it. "It is unquestionably aperient and diuretic, and produces effects very similar to opium. * * * Like that drug, however, it excites the torpid and languid, while it calms the restless and induces sleep." I have little doubt but that great resemblance does exist between this and the kindred plant, the cassina, from which also was prepared a "black drink," which was used by the Indians of North America in their ceremonials. The mode of preparation may be lost to us.

In a letter from Mr. Simms, April, 1863, he says: "I think there is some mistake among the authorities you quote when they assert this to be the material out of which the Indians manufacture the famous "*Black Drink*" used at their most solemn festivals, and which I have always understood, while travelling among them forty years ago, to be compounded of *various roots*, by decoction, and acting as a powerful emetic. The leaves used moderately as we use tea, have never as I believe acted thus upon the system."

The *Yaupon* is sometimes referred to as *I. vomitoria*. The Indians drank it very strong, and in copious draughts, at a certain period of the year, in order to purify themselves. It acted as an emetic. The *Maté* of Paraguay is not identical, says a recent writer, with our *I. cassina*. Lawson, in his account of this plant, in his Travels in Carolina, (pp. 90, 91, London, 1709,) celebrates the virtues of the tea, and gives a particular account of the mode of preparing it. "This plant, (the *Yaupon*, called by the South Carolina Indians *Cassina*,) is the Indian tea, used and approved by all the savages on the coast of Carolina, and from

them sent to the westward Indians, and sold at a considerable price." "The savages of Carolina bore this tea in veneration above all the plants they are acquainted withal," p. 221. "As for purgings and emetics they never apply themselves to, unless in drinking vast quantities of their *Yaupon* or tea, and vomiting it up again, as clear as they drink it." Croom, in quoting the above, adds that in North Carolina it is still esteemed a useful diaphoretic. Notes to his Catalogue, p. 45, referred to as *I. cassina*, of Walter.

The preparation of *Maté* is very simple. It can be gathered during the whole year It is collected in the woods—"a process of kiln-drying is resorted to upon the spot, and afterward the branches and leaves are transported to some rude mill and powdered in mortars. The substance, after this operation, is almost a powder, though small stems, denuded of their bark, are always permitted to remain." A small quantity of the leaf, either with or without sugar, is placed in a common bowl, upon which cold water is poured; after standing a short time, boiling water is added, and it is at once ready for use. It must be imbibed through a tube on account of the particles of leaf and stem which float upon the surface of the liquid. The plant is not cultivated. See, also, *Ceanothus* and *Thea viridis*.

Ilex dahoon, Walt. Also called cassina. Grows in swamps; it is said to possess properties similar to those of the *I. cassina*.

Ilex myrtifolia, Walt. This is a variety of *I. dahoon*. Grows around ponds, in flat, pine barrens, forty miles from Charleston; Newbern.

Dr. Joseph Johnson, of Charleston, informs me that this is used to some extent in domestic practice in South Carolina, as a diuretic in dropsy.

CUSCUTACEÆ.

LOVE-VINE, (*Cuscuta Americana*, Linn.) Dr. Engleman, of St. Louis, has determined that we have not the *C. Am.* of Linn., and he has substituted three distinct species which are found in South Carolina, the *C. compacta* and *cornuti* of Choisey, and *C. vulgivaga*, Engl. Grows in damp soils; collected in St. John's; Newbern. Fl. June.

Mér. and de L. Dict. de M. Méd. ii, 527; Flora Méd. des Antilles, ii, 334; Shec. Flora Carol. 485.

This is said to be laxative and hydragogue. It imparts a yellow dye to cloth. The vine may be snapped in pieces, and the divisions will retain a separate existence, throwing out new tendrils, and reattaching themselves to surrounding objects.

CONVOLVULACEÆ. (*The Bindweed Tribe.*)

An acrid, milky juice is found in their roots, which is strongly purgative, this quality depending upon a peculiar resin, which is the active principle of the jalap, the scammony, etc., plants belonging to this order.

Pharbitis nil, Chois. *Ipomæa nil*, Pursh. *Convolvulus*, Sprengel. Grows in dry soils; vicinity of Charleston; St. John's; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. iv, 409. The root was employed by the ancients as a purgative.

WILD POTATO VINE, (*Convolvulus*, Ell. Sk. *Ipomæa panduratas*, of late bot.) Found in dry pine barrens; collected in St. John's, Charleston District, where it grows abundantly; Newbern.

Coxe, Am. Dis. 226; Barton's Collec. ii, 49; Ell. Bot. Med. Notes, i, 254; U. S. Disp. 269; Mér. and de L. Dict. de M. Méd. ii, 409; Lind. Nat. Syst. Bot. i, 252; Griffith's Med. Bot. 477. The root is diuretic, and in the form of infusion is said to be very serviceable in calculous complaints. It is employed with great success by Dr. Harris, of New Jersey, in these and in other affections as a substitute for jalap and rhubarb; Dr. B. S. Barton says that an extract from one of our native species is little inferior to scammony. The powder of the decoction may be used.

Convolvulus macrorrhizus, Ell. *Ipomæa* of Michaux. Vicinity of Charleston; dry soils.

U. S. Disp. 408; Ell. Bot. Med. Notes, i, 253; Mér. and de L. Dict de M. Méd. ii, 406; Frost's Elems. Mat. Med. 140. This is thought to resemble jalap. De Candolle mentions the root as possessing purgative properties, (Essai;) and the expressed juice was said to be very active. Lind. Nat. Syst. Bot. 231; Flore Méd. des Antillus, ii, 288. Dr. Baldwin, however, was of the opinion that it possessed very little purgative power. It is said to contain a great deal of saccharine with a considerable quantity of farinaceous matter.

Ipomæa sinnata, Ort. *Convolvulus dissectus*, Mx. The *C. dissectus* abounds in prussic acid, and is said to be used in the manufacture of Noyau. Bot. Mag. 3141; Griffith.

JALAP, (*Convolvulus Jalap.*)

It has been supposed by some that the officinal jalap may be obtained from plants growing within the limits of the Southern States, but late researches have almost disproved it. See U. S. Disp.; Mér. and de L. Dict. de M. Méd.

SWEET POTATO, (*Batatas edulic*, Chois. *Convolvulus batatas*, Cult.) Several varieties are cultivated.

This valuable plant is cultivated to a large extent in the Southern States, and great use is made of the root as an article of food. It may, therefore, not be out of place to furnish some references to the various sources of information concerning it that have come in my way. A large quantity of sago, called "Bowen's patent sago," was made in Georgia from the potato, particularly by Dr. Bancroft, near Savannah. The roots were scraped and grated, the pulp was then mashed through sieves, and the deposited flour collected and dried in pans either by fire or sunlight. See Shec. Flora Carol. The root is used as an article of food prepared in various forms. They may be grated when raw and the pulp made into a pudding; they are sometimes eaten roasted or boiled, in which state, with wheat flour, a very pleasant bread is made of them. On the plantations they furnish a large proportion of the food of animals. Mér. and de L. Dict. de Méd. Supplém. 1846, 205. See Depuy's Mémoire sur la culture de la patate, Bordeaux, 1801; Lelieur de Ville-sur Arce, Mém. sur la culture de la patate et du maïs, Paris; Gosse, Culture de la patate, (Biblioth. Univ. de Genève, iii, 1818;) Roberts' Note on the culture of the potato in the Mém. de la Soc. Roy. d'Agric. 1841; Southern Agriculturist, Charleston, *passim*.

In Patent Office Reports, 1854, p. 169, is an illustrated paper on the Chinese yam, *Dioscorea batatas*, recommended as a substitute for the potato. See *Dioscorea villosa* in this volume.

The *Cantharis vittata*, or blistering fly, can be found on the potato, and I have produced blistering by applying them to the hand. I collected the flies from vines growing on Daniel's Island, near Charleston. Mr. Townsend Glover, in a valuable paper illustrated with wood-cuts in Patent Office Reports, 1854,

page 59, states that he found a species of cantharis, *C. strigosa*, in large numbers on the cotton plants near Columbia, S. C., in the month of September. I have little doubt that the Southern States could be easily supplied with blistering ointment from these flies.

The reader interested in the appearance, nature and history of the "Insects injurious and beneficial" to plants and vegetables, is referred to the paper cited. Those infesting the cotton plant, the peach, the vine, garden vegetables, etc., are all described. I am indebted to Mr. Glover for drawings of these. See, also, Patent Office Reports, p. 88, 1855, in which the papers are continued.

A Substitute for Spanish Flies.—The scarcity of Spanish flies for medicinal use in blister plasters makes a proper substitute a desideratum. A writer in the Savannah Republican says we have in this country many representatives of the same genus, and enumerates the blistering beetle, or potato fly, so prevalent in our gardens, and so injurious to vegetation, as efficacious. He says:

"The blistering plaster and *Cantharides* of medicine are prepared from the Spanish flies, *Cantharis vesicatoria*, which are collected in Spain and Italy in large quantities for exportation. We have in North America many representatives of the same genus. Several species have been used for the same purpose, and in this immediate neighborhood the *Cantharis vittata*, *var*, striped blistering beetle, commonly called the potato fly. The blistering beetles have been enumerated among the insects directly beneficial to man, on account of the important use made of them in medical practice; yet the gardeners in our neighborhood will testify that the insect in question is very injurious to vegetation, appearing in large numbers on the Irish potato, tomato, egg-plant, and beet, which they will strip of every leaf. I have, however, remarked that they will give the preference to a common weed, if in close proximity—an *Amarantus*—a kind of prince's feather. The insect is of a dull, tawny, or light yellowish color, with two black spots on the head, two black stripes on the thorax, and three broad ones on each wing cover. The underside of the body, the legs, (excepting the first joint, which is yellowish,) the *antennæ* or feelers, are black. Its length is from five to eight lines, its breadth of body two lines. The

body is quite soft. These beetles are very shy, timid insects, and whenever disturbed fall immediately from the leaves, and attempt to conceal themselves among the grass, or draw up their long, slender legs and feign themselves dead. In the night and in rainy weather they descend from the plants and burrow in the ground, or under leaves and tufts of grass. It is, therefore, during clear weather, in the morning and evening that they feed, and are to be collected. They should be killed by throwing them into scalding water for one or two minutes, after which they should be spread upon cloth or paper to dry, and may be made profitable by selling them to the apothecaries for medical use."

Dunglison, in his Therapeutics, says that the *Cantharis vittata*, *Lytta vittata*, potato fly, is somewhat smaller than the Spanish fly, (*Cantharis vesicatoria*,) its length being about six lines. The head is of a light red color, with dark spots on the top; the feelers are black; the elytra, or wing-cases, black, with a yellow longitudinal stripe in the centre, and a yellow margin; the thorax is black, with three yellow lines; and the abdomen and legs, which are of the same color, are covered with an ash-colored down, (Wood and Bache.) They are first observed about the end of July or the beginning of August. They are found in the morning and evening, and are collected by shaking them from the plant in hot water, after which they are carefully dried in the sun. It resembles the Spanish fly in all its properties. Other species are found in the United States, viz: *C. cinerea*, a native of the Northern and Middle States; *C. marginata*; *C. atrata*, common in Northern and Middle States; but *C. vittata* is the only one that is officinal, *op. cit. sup.* In England, according to Pereira, the blistering beetle is found on species of the *Oleaceæ*, as the ash, privet, and lilac, and upon the elder and lonicera. Cloths are spread under the trees, and the flies shaken upon them or beaten with long poles; the flies are then killed by being exposed to the vapor of vinegar, hot water, or oil of turpentine. Dr. W. A. Patterson, of Virginia, in a letter to the Richmond Sentinel, 1863, states that he collected a number of the potato flies which produced blistering very readily, when toasted, powdered and mixed with cerate. They may be mixed with two or three parts their weight of a cerate, made of equal parts of resin, wax and lard.

Potato Coffee.—I have seen this used on several plantations in lower Carolina as a substitute for coffee. It is one of the best when carefully made. The following is given as the mode of preparing and using: the sweet potato is peeled and cut to the size of coffee berries, spread in the sun until perfectly dry, then parched in an oven or pan until thoroughly brown before being ground. As much as is intended to be used is then put into a cup with a little hot or cold water; it is mixed well until all is wet; boiling water is added, and it is settled like coffee.

The mucilaginous liquor prepared from potatoes washed and grated, the fecula being allowed to remain at the bottom of the vessel, is used for cleansing silk, woollen and cotton goods, without damage to the color. The coarse pulp which does not pass the sieve is of use in cleansing worsted curtains, carpets, tapestry, and other coarse goods; also in cleansing oil paintings. See Ivy.

Among the plants for supplying *starch*, none is superior to the sweet potato—the red-skin variety, white within, is preferred. Large supplies are made upon our plantations by grating and washing out the starch granules, then drying. See *Maranta arundinacea* in this volume for mode of making *starch;* also, Ure's Dictionary of Arts, Manufactures, etc., vol. 2, p. 462, New York, 1853, for a paper on the manufacture of *sugar* from the potato, with a table of the amount of *starch* in the several varieties of the potato.

Calystegia sepium, R. Br. Fla. and northward.

The decoction of the leaves is a mild purgative. Griffith.

HYDROLEACEÆ.

Hydrolea quadrivalvis, Walt. Immersed in ponds; collected in St. John's; N. C. Fl. July.

A bitter principle exists in this genus.

LOBELIACEÆ.

Lindley states that all are dangerous or suspicious, in consequence of the excessive acridity of their milk.

INDIAN TOBACCO; LOBELIA; EMETIC-ROOT, (*Lobelia inflata*, L.) Grows in Spartanburg and Abbeville Districts, and in Georgia. Fl. August.

Ell. Bot. Med. Notes, ii, 219; U. S. Disp. 434; Barton's Collec. 36, 56; Thacher's U. S. Disp. 267; Frost's Elems.; Mat. Méd. 83. This is one of the most valuable of our indigenous plants, well known as a nauseating diaphoretic and expectorant, possessing some narcotic power, and acting particularly on the bronchial mucous membranes. The infusion of the flowers promotes urine, diaphoresis and the discharge of the lochia; used also in convulsions and palpitations of the heart. The juice which exudes from the plant is of a penetrating and diffusible nature; from its effects upon the eye it is called "eye-bright." The tincture, in small doses, just sufficient to produce slight nausea, is used to prevent colic and croup in infants. The plant in spirits is given largely in the bite of serpents, and the tincture applied externally is said to relieve the pain caused by the stings of spiders and insects. See the "Cherokee Physician." The infusion of the plant is stimulating to the throat, and is largely employed in asthma, as it occasions a copious secretion of saliva and of mucous fluid: "It, however, sometimes operates vehemently and speedily on the stomach." Lind. Nat. Syst. Bot. 237; Mér. and de L. Dict. de M. Méd. iv, 137. Chapman, Bigelow and Barton spoke of it as a very active and dangerous plant. Supplem. to Mér. and de L. Dict. de M. Méd. 1846, 438. Dr. Noach, of Leipsic, says that it acts specifically on the "pneumogastric nervous system," and consequently possesses such a remarkable influence on the bronchial mucous membrane. In Geneva, also, it has acquired great reputation in spasmodic asthma. See the 12th series of the Journal de Chim. et de Pharmacie, i, 454. Dr Elliotson cured two cases in four days with the alcoholic tincture in a sufficient quantity of distilled water. It has been found in Europe very useful in chronic bronchitis, aphony, and nervous affections of the bronchia and in laryngitis and hooping cough. It has been administered in convulsions, tetanus and dance of St. Guy. Mér. Supplém. See, also, Lancet, February 23, 1833. The Indians use it as tobacco, and this is a convenient way of administering it. Rufz, d'empoisonnement practiqué par les Négres, 139; Sigmond on the properties of L. inflata and syphilitica, in Journal de Chim. Méd. ix, 587, 1833; Glasgow Med. Journal, May, 1828; Bidault de Villiers, notice sur l'emploi du Lob. inflat. dans l'asthme et comme émétique, Nouv. Biblioth. Méd. v, 226. *Lobeline* has been extracted from it: Phil. Journal

Pharm. 1834. Dr. Proctor found it also to contain an odorous volatile principle, a peculiar acid, *lobelic*, gum, resin, fixed oil, lignin, salts of lime, potassa, oxide of iron, etc. Am. Journal Pharm. ix, 106, xiii, i. It has been used as an enema in the same way as tobacco, and, in small doses, to produce relaxation of the os uteri. Eberle employed it with success in a case of strangulated hernia; he considers the root and inflated capsule the most powerful parts of the plant. Am. Journal Med. Sc. xvii, 248. Some have doubted whether it produces its effects in the same way as tobacco. Dr. Cutler, who introduced it, says if the leaves be held in the mouth, they induce giddiness and pain in the head, with agitation, and finally nausea. Both Dr. Randall and himself found it very efficacious in asthma, and employed it as a speedy expectorant in catarrh; the latter did not observe any narcotic effect ensue from it in moderate doses. In New England the infusion has been used advantageously in leucorrhœa. The active principle is extracted by water and alcohol; hot water is said to impair its emetic power; ten to twenty grains of the powdered leaves will act as an emetic, a moiety less as an expectorant; two ounces of the dried plant are added to one pint of diluted alcohol, of which one teaspoonful given to an adult will generally bring on nausea and sometimes vomiting. This is the form in which it is usually prescribed in asthma, repeating it several times a day, and desisting when headache or nausea ensues. Coxe, Am. Disp. 373; Big. Am. Med. Bot. i, 179; Cutler, Mem. Am. Acad. i, 484; Schœpf, 128; Mass. Report. vi; Griffith's Med. Bot. 419; Raf. Med. Fl. ii, 22. Dr. Livezey in a paper in the Bost. Med. and Surg. J., v, 35, 110, advises the tincture or infusion in the catarrhal affections of children, and the saturated tinct. to be applied externally in erysipelas. Great use is made of the lobelia in South Carolina and Georgia—the steam and vegetable practitioners relying on it. Obstinate and very violent cases of flatulent colic, which the tinctures of cardamom, etc., fail to relieve, we know to be immediately dissipated by preparations of this plant. See Matson's Veg. Pract. and Howard's Imp. Syst. Bot. Med. 334. I have generally selected the tincture or powder of lobelia wherever I thought relaxation was required, and where there was a tendency to spasmodic action. Some physicians use the powder habitually as an emetic; others consider it too depressing for ordinary cases, and

prefer ipecacuanha. The habit of giving an agent like this repeatedly, almost daily, throughout a long attack of pneumonia, must certainly be injurious; it is, nevertheless, adopted by some practitioners. I saw a patient recover to whom it had been given in emetic doses every day for three weeks. Dr. Gaston, of Columbia, used the tincture successfully in Tetanus. Dr. Proctor has prepared a fluid extract—each teaspoonful of this represents thirty grains of the powder. U. S. Disp., 1866.

Lobelia syphilitica, L. Mountains of Carolina and Georgia; Newbern. Fl. September.

Bart. M. Bot.; Ell. Bot. Med. Notes, i, 268. In the Dém. Elém. de Bot. ii, 92, it is spoken of as an acrid and purgative plant: "Se guérissont de la vérole en buvant une decoction de cinq à six racines." Am. Herbal, 208. The Indians employed the decoction internally and topically for lues; they communicated their opinion of its virtues in this respect to Sir W. Johnson, who published it in the April number of the Amæn. Acad.; Woodv. Med. Bot. 177; Kalm. L. C.; Linn. Veg. M. Med.; Thornton's Fam. Herbal. 727. Dr. Wood, in the U. S. Disp. 436, allows it emetic, diuretic and cathartic properties, but denies it any value in syphilis. Dr. Chapman states that it is beneficial in dropsy. It is less powerful than the *L. inflata*, but more diuretic and diaphoretic; its diuretic effects are produced by free doses, purging or vomiting as it is augmented. From an analysis by M. Boissel, it is found to contain a fatty, butyraceous matter, sugar, mucilage, a volatile bitter substance, some salts, etc. Mér. and de L. Dict. de M. Méd. iv, 138; Des Bois de Rochefort, Mat. Méd. ii, 212; Dict. des Drogues, iii, 378. For analysis, see Journal de Pharm, x, 623; Kalm. Description du Spécifique contre le Mál. Vênérien, in the Mém. de l'Acad. de Storck, xii, 1750.

CARDINAL FLOWER, (*Lobelia cardinalis*, L.) Grows in inundated soils, roots often immersed; vicinity of Charleston; collected in St. John's Berkeley, Charleston District; Richland; Newbern. Fl. July.

Ell. Bott. Méd. Notes, i, 268; Drayton's Views, 77; U. S. Disp. 436; Mér. and de L. Dict. de M. Méd. iv, 137; DeCandolle's Essai, 189; Journal de Pharm. iii, 470.; Bart. M. Bot. ii, 186; Lind. Nat. Syst. Bot. 236; Griffith's Med. Bot. 421. This plant is used by the Indians as an anthelmintic—some say quite

as efficient as the pinkroot. (*Spigel. Maryland.*) Mérat says it is employed as a poison by the negroes at the Cape of Good Hope. It is well known for its beautiful scarlet flowers.

CINCHONACEÆ. (*The Coffee Tribe.*)

The grand features of this order are powerful febrifugal properties in the bark and emetic in the root. Quinquina represents the first, and ipecacuanha the second.

JAMAICA BARK, (*Exostemma Caribæum*, R. and S.) South Fla. Chap.

The capsules, before they are quite ripe, are very bitter, and their juice causes a burning itching on the lips; Jaquin's Amer. The bark is febrifugal, and often causes vomiting, especially if it be fresh; it is in convex fragments, at first sweetish and mucilaginous to the taste, afterwards bitter and disagreeable. It is also known as Quinquina Caraibe. Griffith. Other plants belonging to the Cinchona family, and growing in this country, should be examined; such, for instance, as the two species of the genus *Randia*, growing in S. Fla.; also *Borreria*, for emetic properties.

GEORGIA BARK, (*Pinckneya pubens*, Mich.) "Found from New River, South Carolina, along the seacoast to Florida." Vicinity of Charleston. Plants sent to me by Dr. F. P. Pope from Bluſton, S. C.; abundant in Liberty County, Ga.; Jones. Fl. June.

Ell. Bot. Med. Notes, i, 267; Coxe, Am. Disp. 1830; U. S. Disp. 128; Frost's Elems. Mat. Med. 519; Griffith Med. Bot. 366. It was said by Michaux in his N. Am. Sylva to be very useful in intermittent fever. Dr. Law, of Georgia, cured six out of seven cases with it. It did not distress the stomach, though to two patients one ounce was given at a dose; one drachm is the usual quantity in which it is administered. Dr. Farr detected a considerable amount of *cinchonine* in it, but was prevented from completing his examination. The attention of those residing where it may be found is invited to it as a substitute for quinine. In Georgia a handful of the bark is boiled in a quart of water till the liquid is reduced to one-half; the infusion is given. The powdered bark may also be given in doses of a drachm.

Surg. A. M. Fauntleroi, of Va., reports in Confed. S. Med. J. for April and Sept., 1864, the results of his experience with the extract given generally in six to ten grain doses every second hour. He concludes thus: From a careful study of the cases, I believe "that the extract has undoubted anti-periodic properties, still it is too slow in its action to be used as a substitute for quinia. It has, with one exception, always produced diaphoresis. Its therapeutical action is principally that of a tonic, and it deserves a position in the front rank of vegetable tonics. From the tardiness of its action, and its effect upon the vascular system, together with its manifest invigoration of the digestive organs, I am induced to think its energy as an agent is displayed through the organic nervous system."

MITCHELLA; PARTRIDE-BERRY, (*Mitchella repens*, L.) Vicinity of Charleston; grows in shady swampy lands; collected in St. John's. Fl. May.

Ell. Bot. Med. Notes, 199. An infusion of the stems and leaves is used in dysuria, its diuretic powers, however, not being of any importance. A decoction of this plant is esteemed a good emetic, and has obtained, says Mills in his Statistics of S. C., a very general use. The "Cherokee Doctor" declares that the "decoction taken freely is an excellent article to facilitate childbirth. It should be used daily for two or three weeks before that period!" The fruit is slightly acid and is edible. It resembles the pipsissewa and may be used in the same manner as that plant, being diuretic, tonic and astringent. U. S. Disp.

BUTTON-BUSH, (*Cephalanthus occidentalis.*) Grows along rivulets in damp soils; collected in St. John's; specimens from Aiken; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, 487; Drayton's View, 62; Mér. and de L. Dict. de Méd. ii, 176; Shec. Flora Carol. 376. The decoction has been used in palsy. Elliott states that the inner bark of the root is frequently employed in obstinate coughs. Mérat notices it as an anti-venereal. A writer in the "Mercury" says: "The root of the *buttonwood* or *crane willow*, a shrub which is conspicuous in our swamps in the spring, when boiled with honey and cumfrey, makes a pleasant syrup, which is the most effective remedy known to me in diseases of the lungs. It is thought by many intelligent persons to be a radical *cure for consumption!*"

Psychotria lanceolata, Nutt., and *P. undata*, Jacq., both growing in South Fla., should be examined as this genus is closely allied with the Ipecacuanha, and the S. American species *P. emetica* are the same as those of Ipecacuanha.

COFFEE, (*Coffea Aribica*, L.) Exotic.

Should the culture of coffee be attempted in the Southern States, I would refer the reader to Patent Office Reports, Agriculture, 1858, p. 313, for an instructive condensed report on the mode of cultivation in Jamaica, Central America and other countries, with the mode of planting, harvesting, curing, etc., etc. See "Potato," "Okra" and "Rye" for substitutes for coffee.

RUBIACEÆ. (*The Madder Tribe.*)

MADDER, (*Rubia tinctorium.*) Exotic.

Any one interested in ascertaining what amount of any plant, vegetable or agricultural product was exported from or imported into the United States, can obtain a list of quantities and value in Patent Office Reports, 1858. It serves to show the consumption of certain articles, the demand for them, and the consequent necessity for their cultivation. I find upon consulting these tables, that madder, for example, was imported to an enormous amount, twenty million pounds, for calico-printing, dyeing, etc ; a plant which might be cultivated within our limits. See method, Patent Office Reports, 1855. So, also, soda, barilla, coffee, and numerous other articles which we are or were in the habit of importing. We may find among the genus *Galium*, some plants yielding dyes—*Galium trifidum*, L. and *hispidulum*, (*Rubia Brownii*, Mx.,) grows from Florida to North Carolina. *G. verum*, found in England, contains so much pigment as to have been cultivated in place of madder. "Its flowering tops boiled in alum dye a bright yellow color, its roots yield a red dye equal to that of madder, and the whole of the plant when bruised has the property of curdling milk, and is sometimes employed both for coloring and flavoring milk intended for cheeses;" hence called cheese-rennet. Rural Cyc.

Since writing the above, I see it stated by Pursh that the Indians use our *G. trifidum*, L. (*G. tinctorium*) for dyeing their porcupine quills, feathers, leather, etc., of a beautiful red color.

Oldenlandia, *Houstonia*, *Hedyotis.*—These plants, growing abundantly in the Southern States, and belonging to the madder tribe, should be experimented with for tinctorial purposes.

CAHINCA OR CAINCA, (*Chiococca racemosa*, Jacq.) South Florida. Chap.

The *C. racemosa* of L. is supposed to furnish the root called Cainca which was much used in Brazil as a tonic, diuretic, purgative and emetic. The bark yields *cahincic* acid which is believed to be the active principle.

Dr. Wood (U. S. Disp., 12th Ed.) makes the following statements respecting the plant. In moderate doses it gently excites the circulation, increases the discharge of urine and produces evacuations from the bowels; but is rather slow in its operation. It may be made to act also as a diaphoretic by keeping the skin warm, using warm drinks and counteracting its purgative tendency. In some patients it occasions nausea and griping, and in very large doses always acts powerfully both as an emetic and cathartic. The bark of the fresh root rubbed with water was used in the bite of serpents—given in quantity sufficient to excite vomiting and purging. Patrick Brown, Dr. W. adds, speaks of the root of *C. racemosa* as very useful in obstinate rheumatism. The virtues of Cahinca in dropsy were made known to the European public in 1826. A. Richard and M. François, of Paris, published accounts of it, the latter considering it superior to all others as a remedy in dropsy; but this estimate has not been sustained by the experience of all who have used it. It was employed in substance, decoction, extract and tincture. The powdered bark of the root was given as a diuretic and purgative in a dose varying from a scruple to a drachm; but ten to twenty grains of the spirituous extract was preferred. In dropsy Dr. F. advised that the full impression of the medicine should be produced at once, which should be maintained by smaller doses, repeated three or four times a day. U. S. Disp.

CAPRIFOLIACEÆ. (*The Honeysuckle Tribe.*)

Independently of the fragrance and beauty of these plants, astringent and purgative properties are possessed by some of them.

FEVER-ROOT; WILD IPECACUANHA; WILD COFFEE; HORSE GENTIAN, (*Triosteum perfoliatum*, Linn.)

Bart. M. Bot. i, 59; Barton's Collec. 29; Ell. Bot. Med. Notes, i, 271; Big. Am. Med. Bot. i, 91; Raf. Med. Fl. i, 59; Griffith Med. Bot. 353. This plant acts as a gentle but certain cathartic, particularly when combined with calomel, when its operation is almost as marked as that of jalap. The bark of the root is also emetic, the leaves and stalks proving less powerful. To produce its cathartic effect Bigelow finds a somewhat larger dose than that of aloes or jalap necessary, though it is supposed to be influenced by age. Rafinesque says the leaves are also diaphoretic; and it is stated by Dr. Muhlenberg that the hard seeds, properly prepared, are a good substitute for coffee. Randall, in his communication to the Linnæan society, asserts that water extracts its virtues best; but it is now recommended to be treated with alcohol. The decoction is said to be used by the Cherokee Indians in the cure of fevers; also given hot in colds and female obstructions. The dose as a purge is from ten to fifteen grains of the extract, and twenty to thirty grains of the powdered root. Dose of the extract from ten to twenty grains.

DR. TINKER'S WEED, (*Triosteum angustifolium*, Linn.) Grows in South Carolina.

Griffith Med. Bot. 353. Possesses properties similar to those of the *T. perfoliatum*.

WOODBINE, (*Lonicera sempervirens*, Ait. and T. and G. *Caprifolium*, Ell. Sk. Grows in wet swamps; more abundant in lower country; vicinity of Charleston; collected in St. John's. Fl. May.

Mér. and de L. Dict. de M. Méd. iv, 143. The plant is not much used in medicine. The syrup made of the leaves is given in asthma, and in angina tonsillaris. The leaves and bark of the *L. caprifolium* of Linn. are styptic and acrid; the flowers diuretic; the latter in decoction calm the pain of colic (coliques ou tranchées) following childbirth.

BUSH HONEY-SUCKLE, (*Diervilla trifida*, Mœnch. and T. and G. *Diervilla Canadensis*, Ell. Sk. Muhl. *Lonicera diervilla*, Linn.) Grows in the mountains of South Carolina and Georgia. Fl. June.

Dém. Élém. de Bot. iii, 554. The leaves possess a narcotic principle, inducing nausea, and are recommended as a gargle in

catarrhal angina. The decoction calms the pain attending the disease; taken largely it causes stupor and catalepsy.

BLACK HAW, (*Virburnum prunifolium*, L.) Fruit edible.

Dr. Phares, of Newtonia, Miss., calls attention in the Atlanta Med. and Surg. Journ. (1847) to the medical properties of this plant. He regards it as a nervine, anti-spasmodic, astringent, diuretic and tonic, and claims that in the nervous disorders of pregnancy and uterine diseases, it is a valuable remedial agent. He says: "It is particularly valuable in preventing abortion and miscarriage, whether habitual or otherwise; whether threatened from accidental cause or criminal drugging." The editor of the same journal adds his testimony in favor of the same remedy, and details several cases when threatened miscarriage was promptly arrested by its use. It is given in the form of infusion or decoction of the bark, in doses of from one to two ounces, repeated every two or three hours, until the pains cease; then lessen the dose and lengthen the interval according to circumstances. Where there is a tendency to abortion, it may be used as a preventive three or four times daily, for a great length of time. (Richmond Med. J. Jan., 1868, p. 77.) See *Hamamelis Virginica*, for which the same virtues are claimed. The Black Haw may probably contain *viburnic acid*, which was thought to be yielded by the Elder, which is closely related to it.

ELDER, (*Sambucus Canadensis*, Linn.) Grows abundantly along fences and in rich, damp soils; diffused; Newbern. Fl. June.

Lind. Nat. Syst. Bot. 248; Bell's Pract. Dict. 404; Drayton's View, 55; Le Mat. Med. ii, 325; U. S. Disp. 625; Royle, Mat. Med. 423; Cullen, Mat. Med. ii, 534; Mér. and de L. Dict. de M. Méd. vi, 196; Griffith Med. Bot. 354. "The leaves are fetid, emetic and a drastic purgative;" the plant acting in the same way as the European species, the *S. nigra;* the leaf-buds also operating as a powerful purgative. The bark yields *valerianic* acid. The juice of the root has been highly recommended in dropsy as a hydragogue cathartic, sometimes acting as an emetic, in the dose of a tablespoonful, repeated every day with less frequency if it act with violence. Dr. Stratton, of New Jersey, uses a syrup in place of Sarsaparilla, made with the juice of the berries. New Jersey Med. Rep., vii, 466. U. S. Disp. The flowers are excitant and sudorific, and are used in the form

of an ointment as a discutient. The inner bark is a hydragogue cathartic and emetic, acting well in dropsy, and as an alterative in various chronic diseases. The purgation which results from its employment is sometimes, however, too severe. The berries are diaphoretic and aperient, and are used as a remedy in rheumatic gout and syphilitic affections. The juice of these diluted with water furnishes a cooling and valuable laxative drink. This plant is employed to some extent in domestic practice for the purposes severally referred to above. A decoction made by pouring boiling water over the leaves, flowers or berries of the elder is recommended as a wash for wounds to prevent injury from flies. An ointment used for the same purpose is prepared by stirring the elder or mixing the juice into lard while boiling, and straining through a coarse sieve. Beeswax may be added.

Surg. S. R. Chambers' reports in the Confed. States Med. Journal, Jan., 1865, that he has used the following ointment with complete success in at least one hundred cases of camp itch. In ordinary cases it will cure in one week. The patient is first made to wash well with soap and water, to dry the parts affected, and then to rub the ointment on the parts affected with the hand until it is absorbed. One pound of the inner bark of the elder, in two and a half pints of water is boiled down to one quarter of a pint. Then one pound of lard and four ounces of sweet gum are added, evaporate the water and at the same time skim whatever filth may rise to the top of the vessel, after which set it aside to cool. When thoroughly cool add two ounces of basilicon ointment, three of olive oil and half an ounce of flour of sulphur. See, also, *Phylotacca decandra*, Poke. According to Mr. Cozzens, the ripe berries afford a delicate test for acids and alkalies. The elder berry stewed with copperas, vinegar and alum, makes, as I have seen, an excellent ink and a dye.

Recipe for Blacking.—Boil elder berries well, mashing the pulpy matter. Then strain through a colander and bottle for use. The liquid sours somewhat by age, but retains its qualities.

Another.—Simmer ripe elder berries over a slow fire in an iron kettle for one hour, and let the mass cool, and you will have good blacking.

The juice may be pressed out and put away for use as you may need it, and the pulp or mass may also be used.

The leaves of the English elder (*S. nigra*) are noxious to insects, moles, etc. The flowers are used in fomentations and cooling ointments. "The leaves boiled in lard make one of the most emollient and suppling unguents known to the farmer. The flowers are used for making a perfumed, distilled water. The berries, according to experiments of M. Wehrle, of Vienna, produce a comparatively much larger quantity of spirits than can be obtained from the malt of the best wheat. The juice in these experiments was expressed from the berries, treated in the same manner as the must of grapes, and afterwards distilled." Wilson's Rural Cyc. It would be interesting to ascertain to what extent our species share the above properties. The following is from the Lynchburg Republican, 1863: "Excellent brandy is distilled from the berries of the common elder bush. The sample shown us contains 70 per cent. of alcohol, which is about 30 per cent. more than is contained in ordinary liquor. The taste is fully equal to the best apple brandy, which it resembled so closely as to be undistinguishable except by a good judge. The process of manufacture is exactly similar to that of apple or peach brandy."

COMPOSITÆ.

These embrace four orders, all of which are distinguished by bitterness, which in the different sections is variously combined. In the order Asteraceæ it assumes a particular character, being united with a resinous principle; in the Cynaraceæ this bitterness depends upon the mixture of extractive with a gum, which is sometimes yielded in great abundance; the Chichoraceæ are characterized by a juice, which is milky, bitter, astringent and narcotic.

Vernonia angustifolia, Mx. Grows in the pine lands in lower country; collected in St. John's Berkeley. Fl. July.

The root is used by the negroes in South Carolina as a remedy for the bite of serpents. It is also considered by them to be aphrodisiac.

WILD VANILLA, (*Liatris odoratissima*, Walt.) St. John's Berkeley, S. C.; Wassamasaw swamp; North Carolina, near sea-coast, (Croom.)

Very aromatic. Used for scenting cigars and tobacco. The

aroma is abundantly given out when trodden upon by horses' feet.

The crystallizable odorous principle *coumarin*, found in the Tonka bean and common to the *Trifolium melilotus*, *Anthoxanthum odoratum*, etc., Mr. Proctor has ascertained to constitute also the exudation upon the leaves of this species of Liatris. Mr. W. H. Lippit, of Wilmington, N. C., had sent him specimens of it which had been collected for the purpose of protecting woollens from moths. U. S. Disp., 12th Ed., and Am. J. Pharm., November, 1859. The chemists now manufacture many of the flavoring fruit essences, vegetable perfumes, coumarin, etc.

BLAZING STAR; BUTTON SNAKEROOT; RATTLESNAKE'S MASTER, (*Liatris squarrossa*, W.) Grows in pine lands; collected in St. John's Berkeley; Richland District; vicinity of Charleston.

U. S. Disp. 1273; Journal de Chim. Méd. v, 419. "Ils sont usitées contre la morsure des serpens." Mér and de L. Dict. de M. Méd. iv, 97. The root is acrid, bitterish pungent, and yields a balsamic substance in alcohol.

Liatris scariosa, W. Grows in pine lands; vicinity of Charleston. Fl. July.

U. S. Disp. 1273, Appendix. It is employed in gonorrhœa, and as a gargle in sore throat. It has a great reputation throughout the South for the bite of serpents. Pursh.

Liatris spicata, W. Grows in wet pine lands; collected in St. John's Berkeley, Charleston District; vicinity of Charleston; Newbern. Fl. July.

U. S. Disp. 1272. One of the "rattlesnake's masters." Dr. Barton said that all the tuberous-rooted *Liatres* were active plants.

This plant, called "button-snakeroot" by some, is reported to be a stimulant, diuretic and expectorant; also possessing powers as an anodyne; it is consequently given as a remedy in colic, the tincture or the decoction of the root being employed—said to resemble senega snakeroot, and to excite a flow of saliva when chewed. These plants are used by the Thomsonians. Riddel Syn. Fl. West. States.

Mikania. An infusion and tincture of a species (Guaco) grow-

ing in South America; are much used for the relief of gouty paroxysms. Our plant (*M. scandens*) should be examined.

THOROUGHWORT; BONESET, (*Eupatorium perfoliatum*, Linn.) Grows in damp soils; diffused; Richland District; common in low country. Fl. July.

Chap. Therap. and Mat. Med. i, 387, and ii, 435; Bell's Pract. Dict. 197; Ell. Bot. Med. Notes, ii, 303; Pe. Mat. Med. and Therap. 389; Frost's Elems. Mat. Med. 216; Eberle, Mat. Med. ii, 216; Royle, Mat. Med. 445; U. S. Disp. 319; Ed. and Vav. Mat. Méd. 197; Big. Am. Med. Bot. i, 34; Thacher's Am. Disp. 217; Am. Med. Record, iii, 331; Barton's Essay to Mat. Med. 28; Ball. and Gar. Mat. Med. 315; Schœpf, Mat. Med. 121; Guthrie, in Annal. of Med. iii, 403; Anderson's Inaug. Thesis, New York; Mér. and de L. Dict. de M. Méd. iii, 177; Coxe, Am. Disp. 271; Shec. Flora Carol. 549; Bart. M. Bot. ii, 133; Lind. Nat. Syst. Bot. 253.

A warm infusion of this plant is emetic, sudorific and diaphoretic; employed cold as a tonic and febrifuge. The hot decoction may be given in the hot stages of fevers without exciting the system. Small quantities of the cold infusion, repeatedly given will, it is said, purge, and are prescribed in constipation. The leaves and flowers, in powders, also purge, even in doses of ten to twenty grains. The discharge of bile is promoted by it. It has been repeatedly prescribed with advantage in rheumatism, typhoid pneumonia, catarrhs, dropsy, and in the influenza which prevailed at the North, and which was described by Dr. Rush; he also used it with great success in the yellow fever of 1798; and Dr. Chapman found it one of the most effectual remedies in the epidemic "break-bone fever." Graves, of Dublin, has made much use of it in the ship, or typhus fever. See note to Graves and Gerhard, Am. ed.

This plant is extensively employed among the negroes on the plantations in South Carolina as a tonic and diaphoretic in colds and fevers, and in the typhoid pneumonia so prevalent among them. In cases of this disease which have come under my observation, I have found this and the senega snakeroot (*Polygala senega*) convenient and useful prescriptions; the latter, with tartar emetic solution, to promote expectoration; and the former, with flaxseed tea, as a stimulant diaphoretic, combining them with spirits of turpentine when it has assumed the typhoid

form. From its action on the capillaries, it has been recommended in chronic cutaneous diseases. Barton said it possessed no power in this respect; but in the hands of Dr. Zollickoffer it has proved eminently successful in tinea capitis, given in combination with cremor tartar. See Griffith Med. Bot. 391. In the Supplem. to the Dict. de M. Méd. 1846, it is reported to have been given with benefit in asthma. Echo du Monde Savant, 16; Janvier, 1845. The infusion of the roots and leaves is usually preferred, of which one to three ounces may be taken several times a day; of the root, in powder, the dose is thirty grains. As an emetic and cathartic a strong decoction is used, made by boiling an ounce of the herb in three half pints of water to one pint; given in doses of one or two gills or more. Given hot, it acts as a diaphoretic; cold, as a tonic.

Thoroughwort or boneset tea used hot, in the cold stages of malarial fever, and cold in the hot stages, is believed by many physicians in South Carolina, who have used it since the beginning of the war, to be the very best of our indigenous anti-periodics as a substitute for quinine. It is thought to be superior in this respect to either poplar bark, (*Liriodendron tulipifera,*) willow, (*Salix,*) or dogwood. It is also an excellent, stimulating diaphoretic in low fevers. The "Indian doctors" make a pill to act upon the liver, which they call the "hepatic pill," by boiling thoroughwort leaves until their strength is extracted, then strain the decoction and continue boiling till it becomes thick—an extract in other words. It is made up with starch into pills, and three are given at a dose. See "Indian Guide to Health."

The extensive diffusion of this plant, and the variety of powers possessed by it, being a sudorific and anti-periodic and a tonic, makes it peculiarly valuable to the people of the Southern States. In the discharge of my duties as surgeon of the City Hospital, Charleston, 1866–7, I have repeatedly made use of the following formula, recommended by Gerhard, in the treatment of bronchitis and pneumonia, and always with satisfactory results: Recipe, eupatorum leaves, one ounce; senega roots, two drachms; roots of sanguinaria, one drachm, (or two of the tincture,) infused in a pint of boiling water, a wineglassful every three hours. This alone is sufficient in most cases of bronchitis. In pneumonia and pleurisy I usually associate with it alterative doses of mercury, ipecac and soda, with revulsives to the skin,

and Dover's powder at night, using supportive treatment also, and stimulants when necessary. Surgeon M. B. Beck reports in the Confed. S. Med. J., September, 1864, excellent effects resulting from the use of a decoction of eupatorium and serpentaria, a half ounce of each to a pint of water, a wineglassful every three or four hours, in cases of typhoid fever, a mild mercurial being premised.

The plants just mentioned, the blackberry, chinquapin, (*Castanea*) and dogwood to be used as astringents, the gentians, pipsissewa, *Sabbatia*, etc., as bitter tonics, can easily be obtained by our soldiers while in camp, and they will be found to fulfil all the indications required in most cases of fever, dysentery, diarrhœa, catarrhs, etc. In the formation of demulcent drinks, as substitutes for flaxseed and gum-arabic, the roots and leaves of the sassafras, and the leaves of the *Bené* (*Sesamum*) will suffice. The *Podophyllum* (wild jalap) will supply the purgative; therefore, with the possession of opium and calomel, the surgeon *in the field* can himself obtain almost everything desired, and with comparatively little aid from the Medical Purveyors. Our chief desiderata were the preparations of potash, viz: nitrate, chlorate and bicarbonate, and sup. carb. of soda. We may procure soda from our *Salsola kali.*

The winter-green (*Chimaphila umbellata*) is both tonic and diuretic, and may be given with advantage in dropsy. In examining (1862) the excrescences produced by an insect on nearly all the leaves of the cotton-wood tree (*Populus heterophylla*, L.) I find them possessed of an intensely bitter principle, which may be made useful as a tonic given in spirits. The cinquefoil (*Potentilla*) is mucilaginous, and I am informed that in Sumter District, S. C., it is used with great advantage as a remedy in affections of the lungs, chronic colds, etc.

PURPLE THOROUGHWORT; GRAVEL ROOT, (*Eupatorium purpureum*, L.) I have a specimen from Abbeville District from Mr. Reed; Richland District; collected in St. John's, Charleston District; grows in damp or inundated soils; vicinity of Charleston. Fl. July.

U. S. Disp. 319; Mér. and de L. Dict. de M. Méd. iii, 177. It is said to operate as a diuretic; and it is one of the popular remedies for calculus, probably possessing properties somewhat similar to those of the *Eup. perf.*

WILD HOREHOUND, (*Eupatorium teucrifolium*, W. and T. and G. *Eupatorium verbenæfolium*, Ell. Sk.) Grows in damp soils; collected in St. John's. Fl. August.

Michaux, Flora Amer. ii, 98; U. S. Disp. 319. This is tonic, diaphoretic, diuretic and aperient. A popular remedy in intermittents, and in fevers and colds. See observations of Dr. Geo. Jones, of Georgia. It may be substituted in some cases for the *Eup. perfol.* Dr. Jos. Jones speaks of this as *E. rotundifolium.* See S. M. and S. Jour., October, 1861.

Eupatorium rotundifolium, L. Grows in dry pine barrens; collected in St. John's Berkeley; vicinity of Charleston; Richland District. Fl. July and August.

Mér. and de L. Dict. de M. Méd. iii, 177; Journal Gén. de Méd. xxxvi, 111. The infusion is said to be useful in consumption. See Dr. Mitchell's letter.

Dr. Jos. Jones, Ga., has employed this by itself and with dogwood bark, with "very good success" in intermittent fevers. S. M. and Surg. Journal, October, 1861.

DOGFENNEL, (*Eupatorium fœniculaceum*, Willd.) Dr. M. Moore, of Statesburg, informs me that the fresh juice of the dogfennel will relieve pain caused by the bites of spiders and insects. The leaves may be beaten in a cloth and the juice expressed. It is believed by some that the presence of this plant indicates the existence of the cause of malarial fevers. It is used to keep off insects and bugs by strewing on the floors of cellars and dairies.

This plant is said to tan leather in an extraordinarily short space of time, by a process which attracted much attention during the fall of 1861. Strange that in my examination of this plant, with that of others, I found that it contained scarcely a trace of tannin. But the common name of dogfennel has been applied to the ox-eyed daisy, (*Leucanthemum vulgare*, Lam.,) and to the wild chamomile, (*Maruta cotula*,) or stinking Mayweed.

The Tallahassee Floridian (1861) says:

"*Leather tanned by the new process.*—We have seen a specimen of kip leather said to be tanned by Isaac Bierfield, of Newberry, S. C., in twenty days, with his dogfennel preparation. The sample was soft and pliable, and had all the appearance of

being equal to the best French leather. We understand that our shoemakers so pronounce it.

"Everybody knows what dogfennel is, and will be glad to learn that it is of some account after all. The weed grows in great abundance and perfection in all parts of Florida. Mr. Bierfield says that now is the time to gather it, and that it should be put under shelter. Planters would do well to lay by a goodly portion of it, as it may prove highly valuable in the manufacture of their leather."

I have not been able to procure, by application made to Mr. Bierfield, any specimens of the plant he uses. I have reason to believe (1867) that my estimate of the want of value in this plant, based purely upon a scientific examination of it, has been amply confirmed and that it never was of any real utility. The dogfennel was only used as an aid, and Mr. J. Commins who tested it alone, found it useless. It may assist in opening the pores of the skin.

MOUSE-EAR, (*Aster tortifolius*, Mx.) Vicinity of Charleston; grows in dry pine barrens; collected in St. John's.

This plant has some reputation in domestic practice in South Carolina as a diuretic. I have noticed the summit generally covered with little insects.

Aster cordifolius. Grows in rich lands. Fl. August.

Griffith Med. Bot. 387. This and *A. puniceus* possess antispasmodic properties. A small species (*Diplopappus linarifolius*, Hooker, *Aster*, Ell. Sk.) grows in pine barrens, St. John's Berkeley, S. C., the leaves of which contain an unusual amount of silica; they are employed to polish horns, and as a substitute for sand-paper.

COLT'S-TAIL; FLEA-BANE, (*Erigeron Canadense*, L.) Common in damp, sandy soils; collected in St. John's Berkeley; vicinity of Charleston; Richland; Newbern. Fl. July.

Royle, Mat. Med. 447; Matson's Veg. Prac. 368; U. S. Disp. 316; Mér. and de L. Dict. de M. Méd. iii, 140; Journal de Bot. 448; et des Pharm. 214; Coxe, Am. Disp. 268; Griffith Med. Bot. 395; Dém. Elém. de Bot. 200; Raf. Med. Fl.

This is a stimulant tonic, diuretic and astringent, employed with marked success in dropsy and diarrhœa; it is much used by the vegetable practitioners in the latter disease; they give a tea cupful of the infusion of the herb in hot water every two

hours; when chewed it relieves cholera morbus. Dr. Depuz found it useful in these diseases. See his observations quoted in the U. S. Disp. 316. He found tannin, gallic acid, and volatile oil among its constituents, from whence its beneficial action in the diseases specified may be inferred. An infusion of the powdered flowers is anti-spasmodic, and is employed in hysterical and nervous affections. The oil obtained from the plant possesses extraordinary styptic properties. The dose of the powder is thirty grains to one drachm.

In the Am. Journal M. Sc., 1866, I find the following, signed J. S. P.:

A New Remedy in Gonorrhœa.—In July, 1859, while narrowly observing the effects of oil of erigeron administered in a fearful hæmoptysis, I was led to suspect that it would prove a useful remedy in the treatment of gonorrhœa. Acting upon this presumption, I immediately commenced giving it to a patient then under my care, in whose case all the vaunted specifics had most signally failed. He improved at once, and was speedily cured. Since that date I have prescribed it in about fifty cases, with unvarying success. It arrests the discharge in about seventy-two hours, and effects a cure in from six to eight days. I do not recommend it as a specific in all cases, but design merely to bring it to the notice of the profession as an exceedingly valuable medicine in this disease. When, in recent cases, the urethral inflammation is severe, my plan is to precede the remedy with a full dose of some active hydragogue. A formula is: R.—Pulv. sennæ scruples ij; pulv. jalap. scruples j., pulv. aromatici grs. x. m. Add a gill of boiling water and a teaspoonful of sugar, and, when sufficiently cool, agitate and swallow at a dose. As soon as this operates, give ten drops of the oil on sugar, and three hours later a full dose of spts. ether. nit. in infus. althea, and so on every three hours alternately until the urethral irritation is allayed. Then leave off the latter, and continue the oil until the cure is complete. If the case is not recent, or there is but little urethral irritation, the oil alone is sufficient. I have used it also in combination with copaba and other articles, and found such preparations to answer a good purpose, but no better than the oil alone.

The oil which I use is reputed to be that of the *Erigeron*

Canadense; but I presume that from the *Philadelphicum* is equal, if not superior, for this purpose.

The oil of Flea-bane, reported by Dr. Wilson, of Philadelphia, as having been used by Dr. Bourvonville and himself in doses of five drops every two hours, with great success in uterine hemorrhage, (Trans. Coll. Phys. N. S. ii, 330,) Dr. Wood says must have been that obtained from *E. Canadense;* U. S. Disp., 12th Ed.

FROST-ROOT, (*Erigeron Philadelphicum*, L. Non. Ell.) Common in pastures; collected in St. John's Berkeley; vicinity of Charleston. Fl. May.

Lind. Nat. Syst. Bot. 253; Shec. Flora Carol. 537; Boyle, Mat. Med. 447; Bart. M. Bot. i, 234; U. S. Disp. 317. It is diuretic, without being offensive to the stomach. Fr. Elèms. 81. In great repute as a remedy in calculus and in nephritic diseases. It was a favorite prescription in Philadelphia in dropsy, and Dr. Wistar recommends it in hydrothorax complicated with gout. Dr. F. L. John, of Philadelphia, obtained from forty-five pounds of the herb only half a drachm of the oil. U. S. Disp., 12th Ed. The plant is officinal. One ounce of the plant to be administered in infusion or decoction of one pint in twenty-four hours.

Erigeron strigosum, Muhl. Grows in sandy soils; vicinity of Charleston.

Griffith Med. Bot. 396. It is similar in properties to the *E. annuum*, a favorite diuretic in the dysuria of children—used by Physick and Dewees in painful micturition dependent on nephritis. This also yields a styptic oil similar to that afforded by the *E. Canadense.*

Erigeron pusilum. Grows in pastures and cultivated soils; collected in St. John's Berkeley. Fl. June.

U. S. Disp. 316.

SNEEZE-WORT; SWAMP SUN-FLOWER, (*Helenium autumnale*, L.) Fla. and northward.

It possesses a bitter, pungent or acrid taste. It appears to be tonic and diaphoretic, and is also powerfully errhine. Clayton and Schœpf have noticed it as useful in intermittent, but it is principally known for its power to produce running from the nose, the whole plant acting thus, but principally the flowers and the central florets. Rafinesque states that Dr. Barton considered it a highly useful substitute for the more acrid articles

of this class, though it is not equal in power to the wild ginger, (*Asarum,*) or the brown powder of the leaves of the Kalmia. Griffith; Barton Flo. Am. Sept.

GOLDEN-ROD, (*Solidago odora*, Ait.) Grows in rich soils, among the mountains, and in the upper districts, according to Ell. Collected in St. John's Berkeley also; Newbern; Fla. Fl. October.

Mér. and de L. Dict. de M. Méd. 437; U. S. Disp. 679; Big. Am. Med. Bot. i, 189. An aromatic, moderately stimulant, and like other substances of the same class, diaphoretic in warm infusion. It is used to allay pain from flatulence, lessen nausea, and cover the taste or correct the operation of irritating or unpleasant medicines. Mérat states that the infusion is also employed as an astringent in dysentery, and in ulceration of the intestines. Journal Gén. de Méd. xxxvi, 3. When the leaves are subjected to distillation a very aromatic, volatile oil collects, and an essence may be made by dissolving this in proof spirits. This will also stop vomiting and correct the taste of medicines, even laudanum and castor oil; Griffith Med. Bot. 397, observes that it is valuable in allaying the pain from headache, externally applied. It is much used in the Eastern States, and Bigelow thinks it will entirely supplant more expensive articles. According to Pursh, the dried flowers are a pleasant and wholesome substitute for tea.

CANADA GOLDEN-ROD, (*Solidago Canadensis*, L. *Solidago procera*, Ell.) Margin of fields. Used in Canada as a most valuable dye.

The leaves and flowers of the English species are used for making a yellow dye; said to be as good as woad. Eng. Flora, v, iii, Farm. Encyc. Its stalks are numerous, straight, and grow almost five feet in height; they afford very strong fibres if treated in the same manner as hemp.

NARROW LEAF GOLDEN-ROD, (*Solidago sempervirens*, L.) Grows in wet lands; vicinity of Charleston. Fl. September.

Mér. and de L. Dict. de M. Méd. vi, 437. Very efficacious in the cure of wounds.

ELECAMPANE; HORSEHEAL; SCABWORT, (*Inula helenium.*) Mountains of North Carolina. Chap. Introduced.

Inuline, a vegetable substance of closely kindred nature to starch and dextrine, was discovered by Rose in *Elecampane*,

and takes its name from the old botanical designation of that plant, (*I. helenium.*) It is spontaneously deposited from a decoction of the roots of *Elecampane*, and it constitutes the greater part of the solid matter of the tubes, both of the dahlia and the Jerusalem artichoke. It is a white powder, and consists by analysis of Payen of 46.6 per cent. of carbon, 6.1 of hydrogen and 49.3 of oxygen. It is soluble in hot water, being distinct from both gum and starch by its insolubility in cold water. But when exposed to a temperature of three hundred and seven degrees, it completely melts, acquires new properties, and becomes soluble both in cold water and in alcohol. Boussingault showed that it is not colored by iodine, while acetic acid, which is without action on starch, produces with inuline precisely the same effects as the sulphuric and other acids; finally, diastase, whose reaction upon starch is so peculiar, so prompt and so powerful, does not cause any change in inuline. It is, therefore, easy to separate these two substances when they are mingled, by heating the mixture either with acetic acid, which dissolves the inuline, or with diastase, which dissolves the starch. I insert the above from Wilson's Rural Cyc. and Boussingault's treatise, on account of the interesting nature of the product. See, also, works on chemistry. The roots should be dug in autumn, and in the second year of their growth, as when older they are apt to be stringy and woody. The dried root has a very peculiar and agreeable aromatic odor, slightly camphorous. The taste at first is glutinous and somewhat similar to that of rancid soap; upon chewing it becomes warm, aromatic and bitter. In its medicinal properties, elecampane is tonic and gently stimulant and resembles calamus. By the ancients used in diseases of females; in the United States mostly confined to diseases of the lungs. It has also been extolled when applied externally for the cure of itch, tetter and other diseases of the skin. Farmer's Encyc. Dose of the powder a scruple to a drachm, of the decoction one to two ounces.

SEA MYRTLE; CONSUMPTION WEED, (*Baccharis halimifolia*, L.) Grows along the seacoast; collected it St. John's, where it is found in abundance; vicinity of Charleston; Newbern. Fl. October.

Shec. Flora. Carol. 256. This plant is of undoubted value, and of very general use in popular practice in South Carolina,

as a palliative and demulcent in consumption and cough; I have frequently seen it used with advantage, and have often heard those employing it confess the benefit derived from it. A strong decoction of the root may be drank several times a day. It is slightly bitter and mucilaginous to the taste. No analysis has yet been made, so far as I can learn. Shecut states that the "bark is said to exude a gum so much resembling honey as to attract bees in great numbers." This, like many others of our indigenous plants possessed of unequivocal utility, is unnoticed in the dispensatories and other works.

BLACK-ROOT, (*Pterocaulon pycnostachyum.*) Grows abundantly in dry pine barrens; collected in St. John's Berkeley. Fl. July.

Ell. Bot. Med. Notes, ii, 324. Much use is made of this plant in St. John's Berkeley, as an alterative; it is supposed to be possessed of decided value. It is well known as the black-root of the negroes. A decoction of the root is given several times a day.

ROSIN WEED, (*Silphium laciniatum*, L. *Qummiferum*, Ell.) Prairies of Ala.; said to grow in Fla.

From Dr. H. D. Garrison's paper in the Eclectic Med. Review, we learn that this plant is brought forward as a new remedy in asthma. It had been used for the heaves or asthma in horses, (see the Am. Horse and Cattle Doctor, by Dr. J. H. Dodd.) Asthma or heaves in horses is said not to exist in the prairies where this plant grows. Dr. King, in the Am. Disp. p. 871, ascribes to the *S perfoliatum*, L., which grows in Ga., tonic, diaphoretic and alterative properties, and alludes to its successful employment in enlarged spleen, liver complaint, miasmatic fevers, etc. He recommends both species in "dry obstinate coughs." The rosin weed, which is sometimes called the polar or compass plant, because its leaves are said to point north and south, is said to be powerfully diuretic. An alcoholic fluid extract is recommended in doses of twenty to forty drops. The dose for a horse is two fluid ounces morning and evening. (Tilden's Journ. Mat. Med. Nov., 1867.)

BURR; BURDOCK, (*Xanthium strumarium*, L.) Grows abundantly in cultivated lands; collected in St. John's Berkeley; vicinity of Charleston; Richland. Fl. August.

Mér. and de L. Dict. de M. Méd. vi, 970; Dioscorides, lib. iv,

133. It has been used in scrofula. The only works in which I have been able to find any account of it are the Dém. Élém. de Bot. iii, 91, where the leaves are said to be astringent, the seeds diuretic, and the expressed juice used in affections of the bladder, and as an auxiliary remedy in the treatment of ring-worm; also in Linnæus, Vegetable Mat. Med. 172, according to which it is found beneficial in herpes and in erysipelas; hence, we may infer that it has at any rate some power as an alterative. Its leaves afford a yellow dye. No use is made of it in the South, so far as I can ascertain. The plant is considered a nuisance by farmers, as the burrs get entangled in the wool of sheep, from which they are with difficulty removed.

Verbesina Virginica, Linn. Grows along fences; collected in St. John's; Richland District. Fl. July.

Griffith Med. Bot. 380. The root, in decoction, is said to be a powerful sudorific:

SPANISH NEEDLES, (*Bidens bipinnata*, L.) Common. The roots and seeds, as well as those of other species of the same genus, have a popular reputation as emmenagogues, and are given by the "Eclectics," says Dr. Wood, in laryngial and bronchial diseases as expectorants. U. S. Disp.

RAG-WEED, (*Ambrosia Artemisiæfolia*, W.) Grows in cultivated lands and pastures; collected in St. John's.

Mér. and de L. Dict. de M. Méd. i, 227. The plant is used in fevers in Maryland as a substitute for quinine; a tincture is made, or the juice is given with whiskey. It is very bitter and is thought to be useful. It is also used by some as a styptic, as I am informed.

Ambrosia trifida, Linn.

Griffith Med. Bot. 387. A plant has been noticed by Dr. Robertson, (Am. Journal Med. Sci. xii, 382, new series,) which appears to be this, which is highly beneficial in arresting excessive salivation.

Parthenium integrifolium, L. Dry soils among Mts. Ala. and northward. Chap.

Recommended by Dr. Mason Houlton as a powerful anti-periodic. The flowering tops, which have an intensely bitter taste are the parts used, and two ounces of them in the dried state, given in the form of infusion, are thought by Dr. Houlton to be equivalent to twenty grains of sulphate of quinine. Thirty

successive cases of periodic fever were cured by this remedy without any unpleasant effect upon the nervous system. Med. Exam. N. S. ix, 719; from Memphis Med. Record. and Pharm. J. xii, 602; from N. Y. J. Pharm.; U. S. Disp., 12th Ed.

Eclipta erecta, Linn. T. and Gray. *Eclipta procumbens*, Ell. Sk. Collected in St. John's; dry soils; vicinity of Charleston. Fl. July.

Griffith Med. Bot. 387. It is said to stain the hair black.

JERUSALEM ARTICHOKE, (*Helianthus tuberosus.*) Cultivated at the South.

Mér. and de L. Dict. de M. Méd. Supplem. 1846, p. 351. The root washed in water and given to animals, will, it is said, produce meteorism, ("météorizations mortelles.") Nouv. Biblioth. Méd. viii, 426.

In Patent Office Reports, p. 578, 1848, a paper on the culture of the *artichoke*, translated from the French, is published. This contains a full description of its various uses as an article of food, etc. I will enumerate some of them:

The tubers are regarded in Alsatia and near Strasburg, as an excellent nutriment for milch cows; equally good food for horses, which are thus kept in a good condition and sustain hard labor. With the addition of salt, they are also useful in feeding sheep. The tubers compare very well with the potato in the amount of dry matter they contain, and its relative value as a root-plant used for fodder is maintained. "The stalks are of nearly as great use as the tubers; and here is the advantage which it has over the potato." Even if the stalk is cut early in September, which diminishes the size of the tubers, it is compensated for by the supply of green food at that early period. According to Schwertz's experiments, one hundred kilogrammes of the green stalks equal, as regards nutritious qualities, 31.250 kilogrammes of our hay. The stalks of the artichoke can be employed even should they be allowed to remain till the tubers are ripe, when they are readily eaten by all domestic animals. "Finally, the stalks of artichokes have for *fuel* a value which no other product of field culture has. To prepare them for use, they are cut in two and made into faggots. This fuel is especially adapted for heating ovens or furnaces."

It bears a great amount of cold. It can be left in the ground

all winter, and does not easily suffer from heat. It is well adapted even to dry and poor soils. The article which I condense contains full information as to the best mode of planting, gathering, etc. "Kade, an Alsatian, saw the same soil produce every year for thirty years a tolerable crop of stalks and tubers of this plant, though it had not for a long time received either culture or manure." Early in April is the best time to plant, but even in winter they can be put in the ground. Withered tubers may be used as seed if soaked; but planting of pieces or cuttings has not the same success as with the potato. Unless the season is too moist the tubers may be left in the ground all winter. To preserve them when gathered "it is sufficient to make a heap and cover them with earth, for they are not affected by cold unless when exposed to the open air. The stalks intended to serve as fodder in place of hay are cut with a sickle, and carefully dried by leaning them up in heaps." M. Vilmernc, of the Agricultural Society of Lyons, remarks that the artichoke was known as an esculent plant by the Romans, but neglected in the dark ages, till it again came into notice in the sixteenth century. Almost all parts of this plant, he says, may be rendered useful. The leaves yield an extract which may be substituted for quinine. The leaves themselves may be cooked and eaten after the fruit is gathered, or used as fodder mixed with certain grasses. They may be substituted for hops in making *beer*, and they contain a great proportion of potash.

The Jerusalem artichoke contains a very large proportion of starch. It is used for making pickles, and eaten as a vegetable. It is easily cultivated, gives less trouble than almost any other plant, reproduces with scarcely any attention, and is a most valuable food for cattle, hogs, etc. See Ure's Dictionary of Arts, Manufactures, etc.; Thaër's Science of Agriculture.

Among our best plants which may be cultivated for *starch* may be mentioned the potato, wheat, rice, arrowroot, (*Maranta arundinacea*,) corn, etc. For methods, see Ure, and domestic receipt books.

SUNFLOWER, (*Helianthus annuus.*) Cult.

Evaporation takes place in plants to an inconceivable degree under certain circumstances. It is known by the experiments of Dr. Hales that a sunflower plant will lose as much as one pound fourteen ounces by perspiration in twelve hours. "Taking

all things into account, a sunflower perspires seventeen times more than a man."

The French make a moxa out of the pith of the sunflower. The English use for this purpose cotton dipped in a solution of saltpetre.

Commander Maury recommended the sunflower to be planted around exposed residences, as a barrier against malaria.

The seeds are used for fattening poultry, as they are highly nutritious. One hundred pounds of the seed of the sunflower are said to yield forty pounds of oil. The réfuse after expression furnishes excellent food for cattle. "From the leaves of the plant cigars are manufactured, of singular pectoral qualities. The stalk affords a superior alkali."

The following I extract from the Farmer's Encyclopœdia:

"An acre of land will contain twenty-five thourand sunflower plants, twelve inches distant from each other. The produce will be according to the nature of the soil and mode of cultivation; but the average has been found to be fifty bushels of the seed per acre, which will yield fifty gallons of oil. The oil is excellent for table use, burning in lamps, and for the manufacture of soaps. The marc, or refuse of the seeds after the oil has been expressed, made into cake, will produce fifteen hundred pounds, and the stalks when burnt for alkali will give ten per cent. of potassa. The green leaves of the sunflower when dried and burnt to powder make an excellent fodder for milch cows, mixed with bran. From the ease with which sunflowers are produced in gardens, (for they seem to flourish in any soil, and to require no particular care,) we may safely say that an acre of land will yield a considerable return. Poultry are very fond of the seeds."

The following appeared in the "Atlanta Commonwealth," 1862:

"*Sunflower seed and groundnut oil.*—The fact has been known for some time that the crop of linseed oil was short, and that there would, in consequence, be a great scarcity of linseed oil. Very naturally those interested began to look around for a substitute, and the oils of cotton seed, sunflowers and peanuts have been favorably mentioned. How far either will serve as a substitute we do not know; but certainly the oil extracted from some one or all of them might subserve some useful end.

"Some years ago the cultivation of the sunflower was strongly urged in an agricultural periodical for various useful purposes; first, for a bee pasture; secondly, the seeds were good for poultry, or the manufacture of oil; and then, after the oil was expressed, to be compressed into oil-cake for cow-food and fattening hogs; the leaves for fodder and the stalk for wrapping paper. In the present condition of the country, these suggestions may not be without value.

"The manufacture of oil from cotton seed, we believe, has been carried on for some time in New Orleans, and the expressed seed made into oil-cake for cow-food. We see no reason why this oil should not be made in any desirable quantity and with great profit, as well as serve most of the purposes for which oil is used."

Anthemis. See Maruta.

WILD CHAMOMILE; MAY-WEED, (*Maruta cotula*, D. C., T. and G. *Anthemis*, L. and Ell. Sk.) Grows in dry soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Bergii, Mat. Med. i, 741; Mér. and de L. Dict. de M. Méd. i, 741; Ed. and Vav. Mat. Méd. 263; U. S. Disp. 278; Shec. Flora Carol. 171; Griffith Med. Bot. 398. A tonic, diaphoretic and emetic; resembling chamomile in its effects, to which it is fully equal, but more nauseous. It is one of our most useful domestic remedies, and is given in numerous diseases. It is also possessed of some power as an anti-spasmodic. A decoction acts as a sudorific and anodyne, and is given in colds and hysterical attacks. By Warner's analysis (Am. J. Pharm., 1858, 390) it contains oxalic and valerianic acid. Mérat mentions it as a substitute for assafœtida, that it is employed as an anti-hysteric, and is recommended in rebellious bilious fever. Dr. Ashby speaks of it as a prompt and powerful vesicant when bruised and applied to the surface as a poultice. Barton and Rafinesque had conveyed a different impression concerning it. Dr. Ashby adds that unlike blisters caused by other vegetable irritants, the vesications readily heal. Journal Phil. Coll. Pharm. Every part of the plant is fetid and acrid, has minute resinous dots upon its surface, and when much handled blisters the skin. Rural Cyc. The flowers of the medicinal chamomile are pow-

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erfully anti-septic—one hundred and twenty times superior to salt.

See "Calamus" for Heberden's estimate of the value of chamomile in rebellious intermittents. A decoction of the leaves of "common chamomile" will destroy all species of insects, and "nothing contributes so much to the health of a garden as these plants dispersed through it."

I would suggest that the Wild Chamomile, the Milfoil, Tansy, (*Tanacetum vulgare,*) be sown with cotton alternately or in the furrows to prevent the *caterpillars.* These all possess a pungent aromatic oil, and they are more or less noxious to animals, insects, etc. The Hemp might also prove serviceable. See *Cannabis sativa* in this volume.

MILFOIL; YARROW, (*Achillea millefolium,* L.) Grows in damp, rich soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

U. S. Disp. 1225, Appendix; Le Mat. Med. ii, 108; Ed. and Vav. Mat. Méd. 267; Bergii, Mat. Med. 738; Hoffmann, "De Præstantia Remed. Domest.;" Matson's Veg. Pract. 299; Mér. and de L. Dict. de Mat. Méd. i, 22; Shec. Flora Carol. 91; Lind. Nat. Syst. Bot. 253; Woodv. Med. Bot. 180. This is an astringent; employed in the suppression of hemorrhages. The Highlanders made an ointment of it to dry up wounds. Linnæus informs us that the inhabitants of Delecarnia mix it with ale in place of hops, and think it imparts to the liquor an intoxicating quality. Lightfoot's Flora Scotica, 486; Thornton's Fam. Herb. A tablespoonful of the expressed juice will arrest spitting of blood; and it is also valuable as an astringent in dysentery. Dr. Buckwald says he experienced great benefit from the plant in the bleeding piles. Stahl boasted of it as a specific; and the great Haller asserts that the infusion, taken inwardly, with the outward application of the leaves, cut fine, will dissipate dreadful wounds—cicatrizing them rapidly. Stahl, Diss. de Thérap.; Hoffmann, "De Præstant. Remed." 18; Linnæus, Flora Shec. 299. Besides the astringent, it possesses a mild, anti-spasmodic, tonic power, which renders it beneficial in hysterical affections and in leucorrhœa. The flowers are stronger than the leaves, being somewhat similar to chamomile, and yielding by distillation a small quantity of essential oil of a blue color. Dr. Grew says it resembles contrayerva in its

effects. Mér. and de L. Dict. de M. Méd. Supplem. 1846, p. 5. See Analysis in Bull. des. Sci. Méd. de Férus, xxii, 119, and xxvi, 253; Soc. de Méd. Botanique de Londres, 1830. It is asserted that this plant has a marked tonic power upon the bladder; it is employed in debility of that organ, and is especially useful in correcting the involuntary discharge of urine in children. A handful of the leaves is infused in a pint of boiling water, and three ounces may be taken by an adult three times a day. See Culverwell's treatment. It has been highly recommended as an emmenagogue, and in painful menstruation, in colic, to bring out the eruption in low forms of exanthematous fevers and in infantile convulsions. Its virtue is no doubt owing to the volatile oil. It contains an acid called *achilleic* acid. Dose of volatile oil, twenty drops. This plant might be found of great service by practitioners residing in the country. The leaves of yarrow, or milfoil, are said by Johnson, in his Chemistry of Common Life, to "have the property of producing intoxication. These are also used in the north of Sweden by the Delecarnians to give headiness to their beer."

TANSY, (*Tanacetum vulgare*, L.) Sparingly nat. in North Carolina. Chap.

The plant emits a strong but not unpleasant odor, and has a bitter taste; said to possess tonic, cordial, and anthelmintic properties. Rural Cyc. See, also, medical authors. The plant yields an oil, and is culinary and medicinal.

OX-EYED DAISY; WHITE WEED, (*Leucanthemum vulgare*, Lam. and T. and G. *Chrysanthemum leucanthemum*, L.) Natural. In upper districts; collected in St. John's Berkeley; vicinity of Charleston. Fl. July.

Shec. Flora Carol. 394; Mér. and de L. Dict. de M. Méd. ii, 271; Nouv. Journal de Méd. v, 208; Griffith Med. Bot. 387. It is vulnerary and detergent. Dém. Elém. de Bot. iii, 212. In Siberia, according to Dr. Rehmann, they employ the plant in leucorrhœa. It is not used in this country. Nouv. Journal de Méd. v, 208. Contraine states that it is a certain safeguard against fleas, destroying or driving them off in a short time. Bull. Acad. Brux. viii, 234.

CUD-WEED, (*Antennaria margaritacea*, R. B. T. and G.

Gnaphalium margaritaceum, L. Ell. Sk.) Grows among the mountains of South Carolina; vicinity of Charleston. Fl. Sept.

U. S. Disp. 1258. It is employed in popular practice in diseases of the chest and bowels, and is externally applied as a fomentation to wounds and bruises. Schœpf says it possesses anodyne properties.

CAT-FOOT; SWEET-SCENTED LIFE-EVERLASTING, (*Gnaphalium polycephalum*, Mx.) Diffused in upper and lower country. Grows in pastures; collected in St. John's Berkeley; vicinity of Charleston; Newbern. Fl. August.

U. S. Disp. 1258; Matson's Veg. Pract. 275. "It probably possesses little medicinal virtue." A popular remedy in hemorrhagic affections, and as a fomentation in bruises and languid tumors. The infusion is employed by the vegetable practitioners in fever, influenza, fluor albus, and consumption; acting probably as a warm sudorific. It has a pleasant, aromatic, and slightly bitter taste when dry, and the leaves are pleasant when chewed. I employed the leaves, flowers and stems largely as a substitute for hops whilst in charge of the S. C. Hospital, Petersburg, Va., during the late war, by direction of the Surgeon-General.

Arnica nudicaulis, Ell. Grows in damp, pine barrens; vicinity of Charleston; St. John's Berkeley, S. C.; Florida; Richland.

Griffith Med. Bot. 409. It is supposed that this may be used as a substitute for the European species, the *A. montana*, which is well known as a powerful plant, possessing stimulant proper ties; directed with peculiar energy to the brain and nervous system. It produces an emetic and cathartic effect, and is much used by the Germans in paralysis, amaurosis, and other nervous diseases. Very useful, also, as a febrifuge, and to relieve pain locally applied in the form of tincture.

RAGWORT, (*Senecio aureus*, Ell. Sk.) Mountains of South Carolina. Fl. July.

U. S. Disp. 1295. It is said by Schœpf to have been a favorite vulnerary with the Indians; the juice of the plant in honey, or the seeds in substance, are employed.

FIREWEED, (*Erecthites hieracifolia*, Raf. *Senecio hieracifolia*, L.) Common.

It possesses a rank odor, and yields its virtues to water. It has been particularly recommended in dysentery; U. S. Disp.

THISTLE, (*Cnicus benedictus*, T. and G. *Centaurea benedicta*, L.) Nat. along the seacoast, near Beaufort; collected in St. John's Berkeley; vicinity of Charleston. Fl. August.

Trous. et Pid. Traité de Thérap, etc., i, 253; Pe. Mat. Med. ii, 408; Ed. and Vav. Mat. Méd. 179; U. S. Disp. 196; Le. Mat. Med. i, 202; Woodv. Med. Bot. 34, i, 14; Ann. de Thérap. 1843, 206; Bergii, Mat. Méd. i, 747; Mér and de L. Dict. de M. Méd. ii, 171; Thompson's Steam Pract.

The plant is emetic, tonic and febrifugal; one drachm of the powder of the flowers in wine, with a decoction of the leaves, is said to be invaluable in anorexia, weak stomach, impaired by irregularities of diet, atony, jaundice and tertian fevers; Thorn. Fam. Herbal, 725; Dém. Elém. de Bot. iii, 115. It is used, also, in chronic diarrhœa and in gout. Woodv. *loc. cit.* A decoction "possesses marked tonic properties;" a large dose acting as an emetic, and occasioning a plentiful discharge from the cutaneous surface. It is employed as a febrifuge, in dyspepsia, pleurisy, and chronic peripneumony. Woodville says the extract is strongly recommended in the catarrh of children; the seeds are very bitter, and may be used with the same intention as the leaves. Rectified spirits extract the virtues of the plant. The watery extract appears, also, to possess the emetic principle. By keeping, a salt is produced upon the surface resembling nitre. See Hist. des Sc. de Berlin, 79; and Duncan's Edinb. New Dispensatory.

This plant is intensely bitter, and the opinions I have derived from many persons residing in the lower portions of South Carolina, particularly in the neighborhood of Summerville, are highly favorable to its use as a remedy in intermittent fever. A strong infusion given warm is used to promote perspiration, and cold to act as a tonic.

The plant possesses a peculiar volatile oil and a principle called *cnicin*, and it is stated by Dr. Wood, also, (U. S. Disp.,) from the Ann. de Thérap. 1843, 206, that in four grain doses it produces vomiting, and, in doses of eight grains, that it was useful in intermittent fever. It should be experimented with more fully by physicians.

BURDOCK; CLOT BURR; BAT WEED, (*Lappa major*, Gært.) Intr. waste places N. C.

The roots and seeds are officinal; odor weak, but unpleasant;

taste mucilaginous and sweetish, with a little bitterness and astringency. The roots contain a gummy extractive matter, sugar, a large quantity of *inuline*, some salts, etc. The roots are diaphoretic and diuretic, formerly much used in syphilis, rheumatism and gout, its principal power, however, being depuratory—given like sarsaparilla in diseases of the skin also. According to Gmelin, it was employed in hysteria. The seeds are said to be more diuretic than the roots, and, according to Linnæus, they are purgative. The leaves are applied externally in *tinea*, the decoction being used internally. Baron used the juice of the leaves mixed with oil as a favorite application to obstinate ulcers. The decoction of the root is made by boiling two ounces of the recent root with three pints of water down to two pints, of which one-half is given daily. Dose of the seeds about a drachm; Griffith. See, also, Gætner and Woodville. A fluid extract, of which a fluid drachm, representing eighty grains of the root is the dose, is prepared by Mr. T. J. Graham, (Am. J. Pharm., March, 1860.) U. S. Disp., note to 12th Ed.

BURR ARTICHOKE, (*Cynara scolymus.*) Ex. Cult.

I call attention to this plant, as it grows luxuriantly in the Southern States.

Mér. and de L. Dict. de M. Méd. Supplem. 1846, 234. "Dr. Montaine, of Lyons, assures us," remarks Mérat, "that each year he treats with success a large number of fever patients with the extract of the leaves in the form of pills." Great use is made of it on the plantations in South Carolina as a tonic and diuretic in dropsy; the leaves are steeped in rum, of which a wineglassful is administered three times in a day; I have frequently seen it prescribed with advantage in this way. It is employed also in jaundice, the expressed juice or the infusion being used; of the former two or three spoonsful may be given; large doses purge. We also use the corollas for curdling milk. The modern Arabians consider the root aperient, and class the gum among their emetics. Lind. Nat. Syst. Bot. 284; Ainslie, Mat. Med. Ind. i, 22. Dr. Copeman, pharmaceutist to the hospital at Norfolk, makes a favorable report on the value of the leaves in the form of tincture and extract, in rheumatism. See London Med. Gazette, 1833, from extracts in Gazette Méd. de Paris, 13th April, 1833. Dr. Barry first employed the leaves in

chronic jaundice, and Perroton, of Lyons, also administered it frequently in the same disease. Révue Méd., Nov., 1845. M. Dussance, in his work on Tanning, 1867, states that the leaves are used in the preparation of leather.

DANDELION, (*Taraxacum dens-leonis*, Desf., T. and Gray. *Leontodon taraxacum*, Ell. Sk.) Collected in St. John's; I have observed it growing in the streets of Charleston and New York; Newbern.

Watson's Pract. Physic, 39; Ed. and Vav. Mat. Méd. 184; Wilson Philip, Diss. Abdom. Viscera; Bell's Pract. Dict. M. M. 445; Royle, Mat. Med. 453; Pe. Mat. Med. ii, 401; U. S. Disp. 706; Le. Mat. Med. i, 396; Brande, Dict. Mat. Med. and Pharm. v, 632; Woodv. Med. Bot. 39, t. 16; De Cand. Prodromus, vii, 45; Ball. Gar. M. M. 319; Bergii, Mat. Med. ii, 687; Mér. and de L. Dict. de Mat. Méd. iv, 87; English Physician, by Nich. Culpepper, gent., "Student in Physic and Astrology," p. 109.

The root is deobstruent, cathartic and diuretic. "Good in obstructions of the viscera, scirrhosites of the liver, stone in the gall-bladder, ascites, jaundice," etc. A decoction of the root is also useful in impetigo and itch; the doses are one drachm of the juice and two ounces of the decoction. Thornton's Fam. Herbal. 677; Dém. Élém. de Botanique, iii, 169. At Gottingen the roots are washed and substituted for *coffee* by the poorer inhabitants; they say the difference between this and the imported article can scarcely be distinguished. It is roasted, powdered and prepared in the same manner. Murray's Apparat. Méd. Withering mentions than when a swarm of locusts destroyed vegetation on the Isle of Minorca the inhabitants subsisted on this plant. The great Boerhaave entertained a favorable opinion of it; and Bergius found it useful in derangement of the biliary apparatus from gall-stones, etc. Mat. Medica. Delius, de taraxaco præsertim aquæ, etc. Dr. Mendelstaed cured black jaundice (l'ictère noir) with it. Van Swieten, in his Comment., Zimmermann, and Störck spoke of it in jaundice and hypochondriacal affections. Later writers have confirmed these opinions expressed by those living at an earlier period.

Dr. Wood, in the U. S. Disp., says that his experience in derangements of the biliary secretions has been decidedly in its favor, it being particularly valuable in chronic hepatitis. Eberle

recommends it in chronic cases of infantile jaundice: "Diseases of Children." Griffith in his Med. Bot. 415, alludes to its use in deranged conditions of the digestive organs, connected with an abnormal state of the liver, and in dropsical effusions arising from the same cause. In habitual costiveness, dependent on a want of due biliary secretion, it acts with peculiar benefit; and, as an adjuvant to more active remedies, where the liver is indurated, it has been prescribed with advantage. It has been employed, likewise, in affections of the spleen, uterine obstructions, chronic cutaneous disorders, etc. When its diuretic effect is desired, it is advised that it be given in combination with supertartrate of potash. This plant is supposed to be possessed of valuable properties as an alterative, and much use is made of it among patients of a strumous diathesis, and those affected with diseases of the skin. I have seen it employed to some extent in New York for these purposes, constituting an important ingredient of diet drinks. It may be easily obtained, and might be found of much service to practitioners residing in the country. The young shoots are eaten as salad. It has been observed that the flowers possess a certain degree of sensibility; for when under the influence of the direct rays of the sun on a summer morning an evident motion of the filaments is perceptible. See MSS. Lect. of Dr. Hope. I have never been able to observe this movement. The plant should be gathered in the summer and early in the autumn. An analysis of it is found to contain gum, gluten, albumen, an odorous principle, extractive, *caoutchouc*, a peculiar bitter crystallizable principle, by M. Pollex who has named it *taraxacin*, some salts, etc. The decoction made with two ounces of the root of a whole plant to two pints of water, boiled to one-half, may be given in doses of a wineglassful; of the extract, the dose is ten grains to a half drachm; the latter should be of a brown color, and entirely soluble in water.

The young shoots are edible, and produce in children a diuretic effect. The leaves and roots of this plant are bitter and contain a bitter milky juice. I have given the extract largely during many years attendance at the Marine and City Hospitals, Charleston. I ascertain that it certainly produces a laxative effect given in from ten to thirty grains—the same, or a much larger quantity dissolved in water, proved diuretic. In this way

I account for the different qualities ascribed to it. There was always a tendency to ascribe a power in the dandelion to act upon the portal system. "The roots of the plant were esteemed to be diuretic, saponaceous and resolvent, and to be powerful remedies for removing obstructions of the liver, and of the other viscera." Their purified, expressed juice has been given, from two to six ounces, twice, thrice, or oftener in the day; and infusions and decoctions of the herb and root have been used for the same purpose. Boerhaave had such a great opinion of the continued use of the juice, or of the infusions of the plant, that he believed they were capable of removing most obstructions of the viscera that were to be relieved by medicines. Bergius, likewise, as was stated, speaks much in the praise of this simple, and says "that he has often seen it prove of service after other remedies had failed; and that he had seen *hardness of the liver* removed by patients eating daily, for some months, of a broth made with dandelion root, the leaves of sorrel and the yolk of an egg with water, while they took at the same time cream of tartar to keep their bodies open;" and he adds "that he has seen a similar course of service in ascites, and in cases of gall-stones." (Thornton's Herbal. 677.) The yolk and white of raw eggs undoubtedly produce a laxative effect; so does the dandelion in the fresh state, or in the form of the extract. It is a useful vegetable laxative in place of calomel.

WILD ENDIVE; CHICCORY, (*Cichorium intybus.*) Introduced. As this plant is cultivated to some extent in the Southern States, and will probably be largely required in the future, I insert the following, which I find in Dickens' "Household Words:"

Chiccory is in truth, however, one of the most harmless substances that ever has been used for the purpose of the adulteration of coffee, not excepting even water—as it is obtained in London. In the case of all low-priced coffee—of all coffee purchased by the poor—adulteration with chiccory yields profit to the grocer simply because it yields pleasure to the customer. Good chiccory and middling coffee dexterously mixed can be sold at the price of bad coffee, and will make a beverage at least twice as good, and possibly more, certainly not less wholesome. Coffee that chiccory would spoil is bought by none of the poor, and by a portion only of the middle classes. We do

not advocate secret adulteration, but we would have the adulteration to be made open, and all people to understand distinctly that since chiccory is altogether wholesome, it is a matter that depends upon the taste and the pocket whether they will buy coffee pure or mixed. Take away all fraud from the use of chiccory, and we shall be glad to see its use fairly promoted. Let us look a little more closely into the subject.

Chiccory is better known to many of us when growing wild in many parts of England on dry, chalky soils under the name of the wild endive; it belongs to a tribe of composite plants called "the Cichoraceæ," in which are included, also, dandelion and the garden lettuce. It shoots above the soil a tuft of leaves, and when it runs to flower, sends up a stem from one to three feet high, rigid, rough, branched, clothed with leaves and blue flowers. It has a long root like that of a carrot, which becomes enlarged by proper cultivation, and is the part used for the manufacture of a substitute for coffee. Every part of the plant is perfectly wholesome—the root when fresh is tonic, and in large doses slightly aperient. Chiccory is cultivated extensively in Belgium, Holland and Germany. It is cultivated in France for its leaves, as herbage and pasturage; in Germany and Flanders for its roots. It was first cultivated in England about 1780 by the well known agriculturist, Arthur Young. It is a most valuable article of farm produce. On blowing, poor and sandy land it yields more sheep food than any plant in cultivation; it will thrive on fen, and bog, and peat; it is good fodder for cattle; it is good for pigs. It grows only too readily, if that can be an objection, for if not carefully extirpated, it is apt to become a vivacious weed. For herbage chiccory is sown precisely in the same way as clover; for the roots it is sown and thinned in the same way as carrots, and taken up, as carrots are, in the first autumn after sowing.

The great demand for chiccory has led to its very extensive cultivation in this country; considerable sums of money have been expended on the kiln and machinery required to prepare it for the markets, and a large amount of capital is at the present time profitably employed upon this new branch of English agriculture. It is not unimportant to notice that the cultivation of chiccory requires and remunerates the use of lands worth from five pounds to eight pounds per acre; that so far

from exhausting the soil, wheat may be grown upon it after chiccory with the greatest advantage; that it furnishes occupation for a very large number of laborers, including women and children, and at a time of year when the fields afford but little other employment; and that, consequently, in some parishes, the poor's rate has been diminished by one-half since chiccory was introduced.

The blanched leaves of chiccory are sometimes used as a substitute for endive, and are commonly sold as an early salad in the Netherlands. If the roots, after being taken up be packed in sand, in a dark cellar, with their crowns exposed, they will push out shoots, and provide through the winter a very delicate blanched salad, known in France as *Barbe de Capucin.* When chiccory is to be used for coffee the roots taken up by the grower are partly dried, and then sold to the manufacturer, by whom they are cut into slices, roasted and ground. The ground chiccory thus made is used by many poor upon the Continent as a substitute for coffee by itself. It has not, of course, the true coffee flavor, but it makes a rich and wholesome vegetable infusion of a dark color, with a bitterish sweet taste, which would probably be preferred by a rude palate to the comparatively thin and weak, and at the same time not very palatable infusion of pure coffee of the second or third quality.

By the combination of a little chiccory with coffee the flavor of the coffee is not destroyed, but there is added to the infusion a richness of flavor, and a depth of color—a body, which renders it to very many people much more welcome as a beverage. The cheapness of chiccory enables a grocer, by the combination of chiccory powder with good coffee, to sell a compound which will yield a cup of infinitely better stuff than any pure coffee that can be had at the same price. Any one with a sensitive taste, and a sufficient purse, would of course buy coffee of the finest quality, and never think of bettering with chiccory the enjoyment of its delicate aroma. The majority of the people, however, are by no means in this position. Coffee, with an admixture of genuine chiccory, (which we take care to procure by purchasing the article in its raw state, and having it roasted the same as coffee,) was preferred to coffee in its pure state. The reason of this we can clearly understand, and will explicitly state. We can afford to sell, and do sell a finer coffee

when mixed with chiccory than we can sell in its pure state at the same price; and the superiority of the coffee in conjunction with the fulness of the chiccory, in our opinion, decidedly gives greater satisfaction to the public.

It is, however, a rule that will bear harshly on the comforts of the poor if coffee is to be sold only in its pure state, and chiccory cannot be obtained in any less quantity than a two-ounce packet. Two ounces of chiccory would go in mixture to about a pound of coffee, and there are thousands who buy coffee itself by ounces. Moreover, the chiccory coffee sold by the grocer is made with coffee of a higher price and better quality than the poor man would dare to give for coffee bought pure, when he has to make another outlay upon chiccory for mixing. The necessity of two purchases would suggest the idea of greater cost, lead to a desire for more economy; so in the buying the poor man would be a loser. Certainly, also, he would lose by having to make at home, in his own clumsy way, the mixture which it had been before the interest of the grocer so to proportion that he might bring custom to his shop by issuing an article as good and palatable as any that could be contrived by his competing neighbors.

"Of all the plants," says Thaër, in his Principles of Agriculture, "which have been proposed as substitutes for coffee, and which when roasted and steeped in boiling water yield an infusion resembling coffee, chiccory is the only one which has maintained its ground. It has been used in this manner for thirty years, even when the price of coffee has been low; and has always yielded considerable profits, both to manufacturers who prepare it in large quantities and those who cultivate it in their neighborhood. It has also been cultivated as a fodder-plant, and highly recommended by Arthur Young in England. A plentiful supply of fodder is obtained without injury to the roots." See Thaër for method of cultivation, etc.

In Patent Office Reports, 1854, p. 348, is a brief notice of the mode of cultivating chiccory. A variety which the French call *Chicorée sauvage à café*, has long fleshy roots like the white carrot, which are used for making coffee. "In the Middle and Southern States the roots may remain in the ground during winter without injury from frost."

Among the substitutes for coffee employed in the Southern

States during its great scarcity, I may mention rye, raw yam potato, cut into small fragments, roasted and parched, okra seed, and corn flour parched and ground, cotton seed, the ground-nut, Bené, etc., which have all been tried. The okra seed is particularly deserving of attention: alone or with a slight admixture of coffee it forms an admirable material, the aroma resembling that of coffee very closely. It is very probable that coffee can and will be cultivated as successfully in Florida as in the West Indies.

WILD LETTUCE, (*Lactuca elongata*, Muhl. *Lactuca longifolia*, Mx.) Damp soils; collected in Charleston District; Newbern; Fla. Fl. June.

U. S. Disp. 421; Ann. de Thérap. Ann. 1843; Woodv. Med. Bot. 75–31; see *L. virosa*, Mér. and de L. Dict. de M. Méd. iv, 10.

It possesses a milky juice; it is said to act as an anodyne, and to produce discharge by the kidneys and skin, being similar in its effects to the *L. virosa* of Europe; according to others, it is destitute of narcotic power; see M. Aubergier's experiments. It should be examined for the presence of lactucarium, the produce of the garden lettuce.

GALL OF THE EARTH, (*Nabalus fraseri*, D. C. and T. and G. *Prenanthes alba*, Ell. Sk.) Grows in damp pine lands; collected in St. John's; Richland; vicinity of Charleston; Newbern.

The root is excessively bitter; it is used in domestic practice in South Carolina as a tonic. I would invite further examination. Dr. N. J. Pitman, of North Carolina, in a communication to Dr. Wood, reports the successful use of the *P. serpentaria* of Pursh, in twelve cases of the bite of the rattlesnake. He gave internally a decoction of the root. U. S. Disp. 12th Ed.

COMMON SOW-THISTLE, (*Sonchus oleraceus*, L.) Diffused; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. vi, 439. It is said to be useful in stagnation of the portal circulation; according to some, it increases the secretion of milk. Fl. Scotica, 428; Dém. Élém. de Bot. iii, 177. The tender leaves are boiled and eaten in some countries as greens; they are of a cooling nature, are applied outwardly as an emollient cataplasm, and are found serviceable in inflammatory swellings, carbuncle, etc. The flowers open at 6, A. M., and close at 12, M. The roots are milky and bitter, but have occasionally been converted into bread. Rural Cyc.

PLANTAGINACEÆ. (*The Rib-grass Tribe.*)

The herbage slightly bitter and astringent.

PLANTAIN, (*Plantago major.*) Nat. Collected in St. John's, near the Santee River; I have also observed it in the streets of Charleston; Richland District; Newbern. Fl. June.

Bergii, Mat. Med. i, 71; Le. Mat. Med. ii, 232; U. S. Disp. 1289, App.; Ed. and Vav. Mat. Méd. 135; Mér. and de L. Dict. de M. Méd. v, 358; Journal Univ. des Sc. Méd. xix, 127.

The leaves, when chewed, tinge the saliva red. This plant was a popular vulnerary and astringent once in great repute. It was also highly valued for its efficacy in fevers. Bergius, however, tested it with unfavorable results. We are informed that "the seeds in milk will stop a dysentery." Boerhaave states, from his own experience, that the fresh leaves applied to the feet will ease the pain and fatigue occasioned by walking, and that the whole plant was esteemed useful in healing and consolidating ulcers and recent wounds, and as a dressing for blisters and sores. The leaves no doubt make a soothing application to inflamed surfaces. A decoction of the leaves in milk was employed as a gargle in inflammation of the fauces, and a collyrium was made with a decoction of the seeds. Thornton's Fam. Herb.; Woodv. Med. Bot.; Dém. Élém. de Bot. 85; Milne, Ind. Bot. 102. It was looked upon as a panacea by the ancients; see Pliny, l. 26, c. 11; Celsus, lib. iii, c. 22; Scultz, Mat. Med. i, 112; Boylé de Util. Phil. Nat. ii, 150; Petzolat, Eph. Nat. cur. cent. vii, Obs. x, 25. It was formerly carried as an amulet. "En fin," remarks Mérat, "on a porté la racine des plantains en amulet pour guérir ou prévenir une multitude des maladies." See the Dict. de M. Méd. Supplem. 1846, 567; Rév. Méd. Juin, 1837, 399. Dr. Perrot communicated to the Soc. des Sc. Méd. de Lausanne a report on the beneficial effects derived from the root in various maladies: Journal Univ. des Sc. Méd. xix, 127; and Desbois says he has seen the good effect resulting from the use of the leaves in scrofulous ulcers and in indolent tumors. Mat. Med. ii, 254. The authors of the U. S. Disp., however, refer to it as a plant of feeble power, allowing it to be refrigerant, diuretic, deobstruent, and somewhat astringent. A chemical analysis would be desirable, as it is probable that a narcotic principle exists in it. M. Dussauce, in his Treatise on Tanning

and Leather Dressing, 1867, cites it among the plants whose flowers and flower tops contain tannin.

RIBWORT; SNAKE PLANTAIN, (*Plantago lanceolata*, Ph.) Grows around Charleston and Savannah; collected in damp meadows in St. John's; Newbern. Fl. July.

Fl. Scotica, ii, 1089. It possesses properties very similar to the above. The Highlanders attribute great virtue to the leaves as an ointment for healing up fresh wounds.

PLUMBAGINACEÆ. (*The Leadwort Tribe.*)

This order embraces plants possessed of very opposite qualities; part are tonic and astringent, and part acrid and caustic in the highest degree.

MARSH ROSEMARY; INK ROOT, (*Statice limonium*, Torrey. *Statice Caroliniana*, Walt. Fl. Carol.) Grows on the seashore. Fl. Sept.

U. S. Disp. 680; Big. Am. Med. Bot. 251; Coxe, Am. Disp. 568. This is one of our "most intense and powerful astringents; much used in New England for all the purposes to which catechu and kino are applied. A large dose acts as an emetic, and in smaller quantities as a powerful expectorant; it also possesses considerable anti-septic power. Its chief popular application is to aphthous and ulcerative affections of the mouth and fauces. Dr. Balies, of Massachusets, found it highly serviceable in cynanche maligna: he used a decoction of the roots both internally and locally, and these beneficial results have been corroborated by others. It is also given with advantage in S. anginosa, and in aphthous fever attendant on dysentery, where bark is inadmissible. From the experiments of Prof. V. Mott, in an inaugural thesis spoken favorably of by Dr. Bigelow, it proved serviceable in chronic dysentery after the inflammatory symptoms had subsided. From his observations, as well as from those of Dr. Edward Parrish, the cold infusion was the best form. Dr. P. found it to contain twelve per cent. of tannin, also gum, extract, alkali, etc., but no gallic acid. Am. Journal Pharm. xiv, 116; Griffith Med. Bot. 525; Am. Journal by John Stearnes, 281; see *S. limonium;* Mér. and de L. Dict. de M. Méd. vi, 524. It was regarded as an astringent in the time of Pliny; lib. xxvi, 28. The root is employed in infusion,

decoction, or tincture. Alcohol is a better solvent of the properties of the root than water. The infusion with cold water is preferable to that with hot. According to Dr. Parrish, the roots of this plant contain tweve per cent. of tannin. M. Dussauce's Treatise on Tanning, p. 78, 1867. It also contains caoutchouc.

Plumbago scandens, L. So. Fla. Chap.

This plant, a native of the W. Indies and So. America, is extremely active, and is known in the French Islands under the name "hérbe du diable." Pison speaks of it as a good emetic in cases of the ingestion of poisons; but, according to Descourtilz, it is too energetic to be given with impunity. Flor. Med. Antill. iii, 94. Brown also speaks of it as extremely corrosive, Hort. Jour. ii, 235; Griffith.

EHRETIACEÆ.

TURNSOLE, (*Heliotropium Indicum.*) Michaux found it at the Eutaw battle-ground, St. John's Berkeley; and Mr. Oemler in the Dutch Fork, in Richland District. Fl. July.

Ell. Bot.; Mér. and de L. Dict. de M. Méd. iii, 462. It has been employed in the cure of headache. See Walkenaer, "Voyage," xii, 469. It is used in Guinea and in India. The juice is applied to eruptive surfaces, opthalmias, etc. Ainslie, Mat. Med. Ind. ii, 414. Rottboll, after Sprengel, says it is a vulnerary, employed in some countries to arrest flooding. Hist. de la Med. iv, 467; Abbet, Guyane, i, 117.

BORAGINACEÆ. (*The Borage Tribe.*)

Characterized by soft, mucilaginous, and emollient properties. Some are said to contain nitre, a proof of which is shown by their frequent decrepitation when thrown on the fire. Lindley.

BASTARD ALKANET, (*Lithospermum arvense*, L.) Introduced. Waste places, Florida and northward.

Wilson states that the red bark of the root stains paper, linen, oily substances, and the human skin; and that it is sometimes used as a rustic substitute for rouge, and as a coloring matter of ointments. Rural Cyc.

HOUND'S TONGUE; WILD COMFREY, (*Cynoglossum amplexicaule*, Mx. *Cynoglossum Virginicum*, L.) Grows in shady spots; Richland and Charleston Districts. Fl. June.

The root is mucilaginous, and much employed in domestic practice for complaints of the lungs, and externally for poultices in sprains, bruises, etc. Farmer's Encyc.

Sheo. Flora Carol. 489. According to Clayton, the root is astringent, and is administered in diarrhœa. The leaves intoxicate when smoked as tobacco. According to Griffith, it is stated that the root may be used as a substitute for comfrey. Med. Bot. 500.

HOUND'S TONGUE, (*Cynoglossum officinale*, L.) Introduced. Waste grounds; North Carolina and northward. Chapman.

The leaves, when touched, emit a pungent and disagreeable odor, like that of mice in a trap. It is supposed to be narcotic, demulcent and astringent, being most active in the recent state; but authorities disagree in their statements, some ascribing poisonous properties to the leaves. Griffith thinks it is probably unjustly neglected. The plant is eaten by goats, but is disliked by all other domestic animals. Its roots have astringent and narcotic properties—regarded as anti-scorbutic. Wilson's Rural Cyc.

Mertensia Virginica, D. C. *Pulmonaria*, L. River banks and mountain streams; S. C. to Tenn. and northward.

Said to be astringent and demulcent, (Riddell,) and is much used in some parts of the country in catarrhs and other diseases of the respiratory organs; Griffith.

LAMIACEÆ OR LABIATÆ. (*The Mint Tribe.*)

These do not contain a single unwholesome or even suspicious species; their tonic, cordial and stomachic qualities are due, according to Lindley, to the presence of an aromatic, volatile oil, and a bitter principle.

AMERICAN SPEARMINT; MINT, (*Mentha viridis*, L. *M. tenuis*, Mx.) Cult.

It is an anti-spasmodic, with a bitter, aromatic taste; contains a volatile oil, much used as a flavoring ingredient, and is said by Culpepper to be also an aphrodisiac. English Physician, by Nich. Culpepper, gent., "Student of Physic and Astrology," p. 214. It is considered by the steam and vegetable practitioners a specific in allaying nausea and vomiting. Thompson's Practice, and Matson's Veg. Pract. 286.

PEPPERMINT, (*Mentha piperita*, L.) Introduced.

We have also the round-leaved mint, (*M. rotundifolia*)—introduced, and often used as a substitute for the above.

They abound in resinous dots, which contain an essential oil. The pleasant, aromatic, stimulant, and anti-spasmodic properties of these labiate plants are well known. They flourish within the Southern States, and the essence and mint water can be extracted in any quantity. See "Gilseminum" and "Sesamum" for extraction of essences, oils, etc. Immense plantations of Peppermint for the production of the oil exists, says Parrish in his Pract. Pharmacy, in St. Joseph's County, in the southern part of Michigan, and in Ohio and Western New York. These are estimated to comprise an area exceeding 3,000 acres, and to yield in oil of Peppermint over $63,000 per annum. For an account by F. Stearnes, see Proc. Am. Pharm. Assoc., 1858. In Patent Office Reports, 1854, the mode of culture of a number of medicinal herbs is described, particularly the aromatic plants, viz: sage, mint, rosemary, mustard, etc., pp. 367 to 380. Nearly all the native and introduced plants containing aromatic oils can be raised at the South in sufficient quantities to supply all demands. An establishment such as that at New Lebanon, New York, and at other localities, for the cultivation of medicinal and useful plants on an extensive scale, should now receive consideration. See my paper in De Bow's Review, August, 1861.

BALM, (*Melissa officinalis.*) Introduced.

The balm, sage, mint, and other aromatic plants, for the most part cultivated in our gardens, need scarcely more than a reference. The melissa is cultivated for bees. The reader is referred to an article on "Secretion in plants," in Wilson's Cyc., showing the deposits of aromatic and other properties at the base of plants, with the theories of De Candolle, Macaire and others.

WATER HOREHOUND; GIPSY WORT, (*Lycopus Europeus*, Eat. M. *Lycopus angustifolius* and *Lycopus sinuatus*, Ell. Sk.) Nat. in damp soils; collected in St. John's Berkeley; vicinity of Charleston. Fl. July.

Ell, Bot. Med. Notes, 25; U. S. Disp. 437; Mêr. and de L. Dict. de M. Méd. ii, 168; Matson's Veg. Pract. 250; Milne, Ind. Bot. 34. This is reputed to give an indelible stain to whatever

it touches. Hoffmann says the gypsies use it to disguise themselves. It has been highly spoken of on the Continent of Europe in intermittent fevers; Prof. Re, of Turin, declares that in doses of two drachms of the dried plant the most obstinate intermittents were removed. Broffiero says it is astringent. See letter (in French) on the properties of *L. Europeus* in allaying fever. Dr. Broffiero's note in the Repertorio Medico Chirurg. 832, and Griffith's Med. Bot. 505. It is employed by the vegetable practitioners in diarrhœa, atonic conditions of the digestive organs, and as a cleansing wash for sores. I would invite attention to this and the following, which are easily obtained. Mills states that the juice gives a fixed black dye.

BUGLE-WEED; VIRGINIAN LYCOPUS, (*Lycopus Virginicus*, Mich.) Diffused; collected in St. John's; vicinity of Charleston; Richland District. Fl. August.

Mér. and de L. Dict. de M. Méd. ii, 168. It has been administered internally with great success in hemorrhage and hæmoptysis; and in phthisis it lessens the force of the circulation. In the diseases first mentioned, Dr. Silliman verifies the results obtained by Linstey—twenty persons having tried it with benefit in internal hemorrhage. Drs. Porter and Winkoop also report cases in which they have employed it with success. See Journal des Sc. Méd. 154. According to Dr. Ives, of New Haven, it is a mild narcotic. Drs. Pendleton and Rogers, of New York, obtained favorable effects from it in incipient phthisis and hemorrhage from the lungs. See New York Med. and Phys. Journal, i, 179; U. S. Disp. 436; Raf. Med. Fl. 11. As a direct sedative, it is useful in diminishing the frequency of the pulse, quieting irritation and allaying cough. Practitioners, observes Griffith, (Med. Bot. 505,) are unanimous in declaring that it is an important addition to the Mat. Med. It appears to act like *digitalis* in abating the frequency of the pulse; its use, however, not being attended with the disagreeable symptoms sometimes accompanying the employment of the latter. An infusion may be given *ad libitum*, made with one ounce of the herb macerated in a pint of boiling water. See, also, Trans. Am. Med. Assoc. i, 347. It imparts a black color to linen, woollen and silk. This plant grows abundantly in the lower country of South Carolina, and its power as a sedative should be examined into.

CANCER-WEED, (*Salvia lyrata*, L.) Grows in shady, rich

lands; collected in St. John's Berkeley; vicinity of Charleston; Richland District; Newbern. Fl. June.

Ell. Bot. Med. Notes, i, 31. "The fresh radical leaves of the plants, when bruised and applied to warts, generally destroy them;" continue the application for a day or two, and renew it every twelve hours. The leaves of the *Hieracium gronovii* are also applied in this way.

RATTLESNAKE WEED; HAWK-WEED; BLOOD-WORT, (*Hieracium venosum*, L.) Upper districts.

This plant enjoys the greatest reputation as an antidote for the bite of snakes. The case is related by Dr. Harlan of a person who allowed himself to be bitten by a rattlesnake, the bite from which subsequently killed a puppy, and he was completely revived after taking a few ounces of the decoction of this plant. See Relation in the 3d vol. Tr. Am. Phil. Soc. U. S. Griffith, Pursh. Fl. ii, 499, and Tech. Repos. ii, 258. Used, also, as an astringent and expectorant in spitting of blood and chronic catarrhs. The dose of the infusion, made with two ounces of the leaves and roots to a pint of water, is a wine-glassful.

SAGE, (*Salvia officinalis*, Ex.) Cult.

Ed. and Vav. Mat. Méd. 268; Mér. and de L. Dict. de M. Méd. vi, 191. This is a warm aromatic, and, according to the experiments of Ellinger, is possessed of marked anti-spasmodic power: it strengthens the circulatory, cutaneous and digestive functions; stimulates the action of the nerves, and has a decided effect upon the cephalic organs, (see Mérat and authors;) prescribed as a stomachic, and in catarrhal and cellular infiltration, and used as a gargle in mucous angina and fungous ulcers. "*Cur moriatur homo cui salvia crescit in horto?*" became an adage, so much confidence was formerly reposed in the plant. Its reputation is most extensive in domestic practice, the warm infusions being given as a sudorific, and in promoting the menstrual discharge. The plant is said to have great power in resisting the putrefaction of animal substances. Van Swieten, Com. ii, 370; Woodv. Med. Bot. It is thought to have a remarkable efficacy in stopping night sweats, infused in wine or spirits, and this opinion was sustained by Quarin, Methodus Medend. 37. Baron Van Swieten also found it efficacious in restraining the inordinate flow of milk after weaning children.

In the English Physician, p. 295, the quaint author, Nich. Culpepper, gent., "Student in Physic and Astrology," mentions it as an aphrodisiac: "Helpeth conception and hinders miscarriage." "Jupiter claims this, and bids me tell you it is good for the liver and to breed blood!" The essential oil deposits camphor in abundance, hence employed as a friction in rheumatism, paralysis, etc. Journal de Pharm. xvi, 574.

I introduce the following on the cultivation of

Sage.—The cultivation of this herb is among the most profitable of the market gardener's products. Large quantities of it are sold while green during the season, as every housekeeper uses it in the cooking of game, or water-fowl, and it is essential as a component of sausages, so that tons of it are used in the winter season. At the price it is usually retailed in the markets of our larger cities, an acre of sage plants will yield a return of over seven hundred dollars; and at the wholesale price, it will give a return of over three hundred dollars to the acre. The seed can be had of most seedsmen. It should be sown in any light, loamy soil, covered about half an inch deep; and when the plants are about two inches high, should be picked out and replanted at distances of about one foot each way. As soon as it has grown so as to begin to show forms of flower buds, cut it off to within two inches of the ground, and so on, again and again, throughout the season. If planted on land thoroughly drained the plant will stand many years; but plants not over two years old produce the best flavored leaves.

DOTTED MONARDA; HORSEMINT; ORIGANUM, (*Monarda punctata*, L.) Grows in rich and damp soils; collected in St. John's, where it is found abundantly; vicinity of Charleston; Richland District; Spartanburg. Fl. August.

Chap. Therap. and Mat. Med. ii, 302; Ell. Bot. Med. Notes, 30; U. S. Disp. 462; Am. Med. Record. ii, 496; Ball. and Gar. Mat. Med. 360; Mér. and de L. Dict. de M. Méd. iv, 444; Bull des Sci. Méd. de Férus, xi, 302. This is another of our very aromatic indigenous plants, possessing stimulant and carminative powers and regarded as a very popular emmenagogue among those residing in this country. The French authorities speak favorably of it; an aromatic oil is obtained from this; and the infusion of the leaves, recent or dried, is very efficient in allaying nausea

and vomiting in bilious fevers. Dr. Chapman mentions cases of long standing deafness cured by the oil rubbed on the head as a counter-irritant. It was used in cases of this description, and in many diseases, by Dr. Atlee, of Philadelphia; see his essay; among other affections in hemiplegia and paralytic diseases, in the sinking state of epidemic typhus, in cholera infantum, where there is prostration of strength, and in *mania a potu;* sometimes employing a liniment, (see Chap, Therap. and Mat. Med. ii, 305;) and sometimes the undiluted oil rubbed on the parts. The oil is of an amber color approaching to red, and if exposed to a great degree of heat, leaves a beautiful straw-colored *camphor!*

THYME, (*Thymus vulgaris.*) Ex. Cultivated at the South. A well known warm aromatic.

GRAVEL ROOT; HORSEWEED; KNOTWEED, (*Collinsonia Canadensis.*) Grows in the mountains of the Carolinas. Fl. September.

The root is used in colic from lochial discharge. Linn. Veg. M. Med. 9. "The infusion of the bruised root in cider cured several alarming cases of dropsy." Shec. Flora Carol. 482, and Mease's Domestic Encyc. ii, 177. Dr. Wood says it possesses tonic, astringent, diuretic and diaphoretic powers; the root in substance, even in small doses, is said to irritate the stomach, and produces vomiting; the active principle is volatile, so that it is best employed in the fresh state. The decoction is efficacious in catarrh of the bladder, leucorrhœa, gravel, dropsy, etc., and as a cataplasm to internal abdominal pains. U. S. Disp., 1248. Mérat says, Dict. de M. Méd. ii, 364, that in America it merits the name all heal, (*guérit tout,*) having the properties referred to above. Drs. A. French and Beers speak highly of it in pains of the bladder, in ascites, and dropsy of the ovaries; given, also, as a powerful tonic in putrid and malignant fevers, and in leucorrhœa; the contused leaves are applied to bruises, lividities, (*les meurtrisseurs,*) pains in the stomach, and as an application to eruptions produced by the poisonous sumachs. (See *Rhus.*) The plant, by chemical analysis, contains tannin, gallic acid, extractive matter, and a coloring principle. *Op. cit.* See, also, Ann. de la Soc. Linn. de Paris, v. 508. In his late work, Griffith (Med. Bot. 513) states that externally it has been employed as a friction in rheumatism. See account of it by Dr.

Hooker, of New Haven, Ann. Linn. Soc. Dr. H. thinks the infusion should be made with a gentle heat, in a close vessel. The best preparation is supposed to be the essential oil, which is said to be an excellent tonic, given with benefit in low fevers, exhaustion of the forces, etc. This plant certainly merits further notice.

Collinsonia anisata. Griffith's Med. Bot. 515.

It possesses an odor somewhat similar to that of aniseseed, having the properties of the *C. Canaden.*

ROUGH-LEAVED COLLINSONIA, (*Collinsonia scabra.*) Collected in St. John's, in shaded soils. Fl. June.

Mér. and de L. Dict. de M. Méd. ii, 364. It is possessed of properties similar to those of the *C. Canaden.* Tonic, astringent and diuretic. See *C. Canaden.*

DITTANY; MARYLAND CUNILA, (*Cunila mariana*, Mx.) Grows in the mountains of South Carolina; Richland; I find it abundant in Spartanburg District, S. C.

Bart. M. Bot. ii, 175; Mér. and de L. Dict. de M. Méd. ii, 517; Lind. Nat. Syst. Bot. 276; Ell. Bot. Med. Notes, 127. The infusion forms a pleasant and refreshing drink; it is diaphoretic, and is employed in fevers and colds. A gentleman in Spartanburg District, S. C., tells me that in his day "everybody cured everything with dittany." Doubtless they took less mercury and drastic purgatives in consequence.

PENNYROYAL; TICKWEED, (*Hedeoma pulegioides*, Pursh.) Grows in the upper districts, and among the mountains of the Carolinas; abundant in Spartanburg, S. C.

U. S. Disp. 365; Bart. M. Bot. ii, 165; Lind. Nat. Syst. 276, and Flora Med. 491; Griffith's Med. Bot. 508; Raf. Med. Fl. i, 231; Bart. Veg. Mat. Med. ii, 165. A gently stimulant aromatic, given in flatulent colic, and sick stomach; also as a stimulant diaphoretic in catarrhs and rheumatism. The warm infusion is a convenient and useful prescription, which is largely employed in popular practice in promoting the menstrual discharge. It is said that the plant, or the oil extracted from it, is an effectual remedy against the attacks of ticks, fleas and mosquitoes.

HEAL-ALL, (*Prunella vulgaris.*) Grows in dry soils; collected in St. John's. Fl. July.

Le. M. Med. ii, 245; Med. Dict. by Carr, art. Brunella; U. S.

Disp. 1291; Ed. and Vav. Mat. Méd. 276; Mér. and de L. Dict. de M. Méd. v, 520. This plant, though possessing some power as a stimulant, has fallen into disrepute. It was also used as an astringent in affections of the throat.

MAD-DOG SCULLCAP; HOODWORT, (*Scutellaria lateriflora.*) Grows along ditches; Richland; collected in St. John's; Elliott says it is found in the mountainous districts.

Watson's Pract. Physic, 386; U. S. Disp. 1294, Appendix; Mér. and de L. Dict. de M. Méd. vi, 274; Bulletin de la Faculté, vii, 191, ann. 1820, where Spalding's (of Geo.) report concerning its anti-hydrophobic virtues is referred to. Youatt spoke in favorable terms of this remedy as enjoying the reputation for some time of being the only one for this disease. See Watson, *loc. cit.*

The above meagre account was all that I could collect with reference to this plant when the first edition of this work was prepared. To show the increased attention which it has received I add the following contained in the 12th Ed. of the U. S. Disp.

It is thought by some practitioners to have valuable therapeutic properties. Drs. Ariel Hunton and C. H. Cleveland, of Vermont, speak in strong terms of its efficacy as a nervine. They have employed it in neuralgic and convulsive affections, chorea, delirium tremens and nervous exhaustion from fatigue or over excitement, and have found it highly advantageous. Dr. Cleveland says that he prefers it to all other nervines or anti-spasmodics except where an immediate effect is desirable. He prefers the form of infusion, which he prepares by adding half an ounce of the dried leaves to a tea cupful of water, and allows the patient to drink *ad libitum*, (Am. J. Pharm., xxiii, 370; N. Jersey Med. Report, v, 13.) Two preparations are now used, *scutellarine*, though erroneously, adds Dr. Wood, as it has no claim to be considered a true proximate principle; the other a *fluid extract*. Dr. C. gives the scutellarine in a dose varying from one to three or four grains and finds very happy effects from it in quieting nervous disorders, (N. Jersey Med. Report, viii, 121.) The fluid extract prepared by Messrs. Tilden is used in the dose of one or two fluid drachms. Dr. Jos. Bates speaks highly of it as a nervine, (Bost. Med. and Surg. Journal lii, 337;) U. S. Disp.

EUROPEAN SCULLCAP, (*Scutellaria galericulata*, L.) Wet places, N. C. and northward.

It has been employed in intermittents. Dr. H. W. Evans, of Canada West, uses an infusion of two ounces of the herb to eight of water, of which he gives in epilepsy a fluid ounce every eight hours, doubling the quantity after a week. To effect a cure he says it must be continued for six months, (Am. J. Med. Sc. xvii, 495;) U. S. Disp., 12th Ed.

Scutellaria integrifolia, L. Diffused in swampy soils; collected in St. John's; vicinity of Charleston. Fl. June.

Intensely bitter, probably useful as a tonic. U. S. Disp. 1294.

CATNIP; CATMINT, (*Nepeta cataria*, L.) Nat. in upper districts; collected also in St. John's; vicinity of Charleston. Fl. July.

Le. Mat. Med. ii, 130; U. S. Disp. 191; Ed. and Vav. Mat. Méd. 216; Bergii, Mat. Med. ii, 540; Mér. and de L. Dict. de M. Méd. iv, 592; Dém. Élém. de Bot. 248; Am. Herbal. 26. This plant is possessed of stimulant, tonic and warm aromatic virtues. Employed in popular practice in colds, asthma, amenorrhœa, chlorosis, hysteria and the flatulent colic of infants; in the latter condition this herb is universally employed. It was used in yellow fever, and, like many others, enjoyed an ephemeral reputation as a remedy in hydrophobia. An infusion of the flowers was said to open obstructions of the liver and spleen. In the Supplement to the Dict. Univ. de M. Méd. 1846, 509, it is stated that Dr. Gustamachia had used the *N. cataria* with great advantage in toothache, caused by cold or carious bone, mashing the leaves in the decayed tooth; this produces an abundant flow of saliva, and causes the pain to cease in a few moments. See, also, Journal de Chim. Med. vii, 2d series. The dose of the powder is a drachm and a half. This plant is used by the vegetable practitioners. Cats roll in it with the same avidity that they do in valerian, and cover it with their urine.

Dracocephálum variegatum. Vent. Grows in inundated swamps; roots frequently immersed. Collected in St. John's; vicinity of Charleston. Fl. July.

Mér. and de L. Dict. de M. Méd. ii, 682. The organization of the peduncle is peculiar. See observations on certain phenomena attending the plant called the *D. Americanum*. Acad.

des. Sci. 276, 1702. It is supposed to possess a "cataleptic powers." "Pourvues de cette singulière faculté," namely: "la propriété, de la cataleptique, c'est-adire, de garder la position dans laquelle on place la fleur." Supplemen. to Dict. Univ. de M. Méd. 252, 1846.

Dracocephalum Virginianum, L. Grows in the mountains of the Carolinas.

Its properties are similar to those possessed by the preceding.

MOTHERWORT, (*Leonorus cardiaca*, L.) Nat. Grows around buildings; vicinity of Charleston. Fl. July.

"The leaves are deobstruent, laxative, diaphoretic, emmenagogue, anti-hysteric and anthelmintic." Am. Herbal. 230; Linn. Veg. M. Med. 168. L. states that the herb, drunk as a tea, is useful in hysteria and hypochondriacal affections. Griffith, in his work on Med. Bot. 515, supposes it to be tonic, and to relieve palpitation of the heart. It is extolled in Russia as a preservative against hydrophobia. In the "Indian Materia Medica" it is stated that "an infusion of the plant is a stimulant, cordial bitter, and when taken at bedtime it procures a quiet, refreshing sleep, even where opium and laudanum have failed." It is probably useful as an ingredient for a soothing tea. See Linden, "*Tilia*."

HOREHOUND, (*Marrubium vulgare.*) Ex. Nat.

Pe. Mat. Med. and Therap. ii, 284; Watson's Pract. Physic, 118 and 332; Ed. and Vav. Mat. Méd. 273; Trous. et Pid. Mat. Med.; Traité de Thérap. 308; Royle, Mat. Med. 470; Le. Mat. Med. ii, 89; U. S. Disp. 452; Ball. and Gar. Mat. Med. 358; Matson's Veg. Pract.; Cullen, Mat. Med. ii, 154; Bergii, Mat. Med. ii, 558; Woodv. Med. Bot. In the United States, it is used only as a warm, aromatic stimulant. The leaves are tonic and somewhat laxative, and are employed in colds, asthma, hysteria and menorrhagic diseases. The warm infusion acts as a sudorific, and is applicable as a palliative in phthisis and pneumonia, but it is not allowed the possession of any very decided powers. In the Supplem., however, to the Dict. Univ. de M. Méd. 457, 1846, it is said to be certainly useful in chronic rheumatism, one ounce and a half of the infusion being given morning and evening. See, also, the Journal des Connaissances Medic. Dec. 10, 1836. Ferrein notices the root as an excellent vermifuge. Mat. Med. i, 279, iii, 312; and Desbois de Rochefort

says the decoction of three or four ounces is a good remedy in tape-worm. Dr. Cutler asserted that the infusion was a very useful application in salivation. Am. Herbal. by J. Stearns, LL.D. Griffith states that obstinate catarrhs are much benefited by the expressed juice taken in milk. Dose, one drachm of the powder, or one ounce to two ounces of the infusion made with an ounce of the dried herb to one pint of boiling water. From this plant it is well known the candy so much used in pectoral affections is made.

The horehound has a bitter taste and an aromatic odor. "It possesses tonic, diuretic and laxative properties, and it seems to owe all its powers to a bitter extractive, a volatile oil and gallic acid." Used in coughs, colds, asthma, etc., on account of the combination of moderate qualities just described. From the very fact of its simplicity, I consider it one of the very best remedies for infants and children suffering with colds and coughs. Given during the day with opiates, and nitre at night, it restores appetite through its bitter principle, it is expectorant and diuretic, and thus removes the slight remains of cold and fever so frequent with children. If the fever is a prominent symptom ipecacuanha should also be used. Besides, it may perform a most important role in taking the place of more active and injurious drugs. I know of no *better remedy* for colds and coughs than the juice or tea of horehound sweetened and given during the day.

VERBENACEÆ. (*The Vervain Tribe.*)

FRENCH MULBERRY, (*Callicarpa Americana*, Mx.) Collected in St. John's, in dry soils; vicinity of Charleston; Richland District; Newbern.

Drayton's View of S. C. 62. This is said to be useful in dropsical complaints. It bears very pretty red berries, growing in whorls around the stem, which are slightly sweetish to the taste. I could not extract much coloring matter from their skins with vinegar or alum.

NETTLE-LEAF VERVAIN, (*Verbena urticifolia*, L.) Common in damp soils; collected in St. John's; vicinity of Charleston. Fl. July.

U. S. Disp. 1304. Boiled in milk and water, and combined with the inner bark of the white oak, it is advantageously used

in poisoning from the sumachs, (*Rhus.*) Mér. and de L. Dict. de M. Méd. vi, 868; Journal de Méd. lxx, 529.

VERVAIN; SIMPLER'S JOY, (*Verbena hastada*, L.) Middle districts of South Carolina, and in Georgia; vicinity of Charleston; Newbern. Fl. Aug.

U. S. Disp. 1304. This is more bitter than the European species, and it is said to be emetic. This plant is described by the "Cherokee Physician" as an emetic inferior to the "Indian Physic;" a decoction of the dry or green herb or a powder is prescribed like lobelia. A decoction of the root is used to check fevers when given in the early stage. The plant should be examined.

Verbena aubletia, L. Grows in the middle districts of South Carolina and in Georgia. Fl. Sept.

Mér and de L. Dict. de M. Méd. vi, 865. It is said to contain a very acrid mucilage. Dic. des. Sci. Nat. x, 426.

PEDALIACEÆ. (*The Oil Seed Tribe.*)

BENÉ, (*Sesamum Indicum.*, *Sesamum Orientale.*) Introduced by the Africans. Fl. July.

This is the *Sesame* of the Anabasis, mentioned also by Dioscorides, Theophrastus and others. The seeds contain an abundance of fixed oil as tasteless as olive, and for which it may be substituted; it is said to be used extensively in Egypt and Arabia. Lind. Nat. Syst. 280; U. S. Disp. 661. Mérat says that in Egypt they drink large quantities of the oil morning and evening, to give them *embonpoint*. It is also used medicinally as a laxative, and is by some preferred to castor oil; also as an application to furfuraceous eruptions. In India it is regarded as an emmenagogue and as provocative of abortion; employed in cutaneous affections and ophthalmia; a solution is given in colic and dysentery, and used as an application for softening the skin. Mér. and de L. Dict. de M. Méd. vi, 332, and the Supplem. 1846, 657, according to which it is also becoming an object of considerable commercial importance, being substituted for olive oil in the manufacture of Marseilles soap. See Essay of M. Hardy, Révue Agricole, Avril, 1845, 177. In the Trans. Phil. Soc., it is said that one hundred parts of the seed yield ninety of oil. Coxe, Am. Disp., art. *Sesam. orient.*, states that

it was found beneficial in a dysentery which prevailed in 1803. I have seen it given to some extent, and with great advantage, in New York, in diarrhœa and dysentery, particularly in these affections as they occur in children; two or three of the leaves, thrown in water, are sufficient to render it very mucilaginous. This is taken internally. It also serves as a convenient vehicle for enemata, gargles, collyria, etc. In South Carolina the seeds are largely used by the negroes in making broths. They are also eaten parched, and are often candied with sugar or molasses. It might be made a source of profit to raise the plant in the Southern States, as it grows well and the seeds bring a high price.

The above was contained in my report on the Med. Bot. of South Carolina, published in 1849.

The oil pressed from the seed will keep many years without acquiring any rancid taste, but in two years becomes quite mild, so that the warm taste of the oil when first drawn is worn off, and it can be used for salads and all the ordinary purposes of sweet oil. In some countries it is used for frying fish, as a varnish, and for some medicinal purposes. Nine pounds of seed are said to yield upward of two pounds of fine oil. The oil may be extracted by bruising the seed and immersing them in hot water, when the oil rises on the surface and may be skimmed off. But the usual mode of extraction is similar to that practiced in the expression of linseed oil. The plant is generally sowed in drills about four feet apart, in the month of April. Am. Farm. Encyc. I consider, after examination, that the sassafras leaf contains more mucilage than the Bené, and that both should be gathered and cured for winter use in making mucilaginous teas to be used in dysenteries, pulmonary diseases, etc.

From a statement of H. M. Bry, of Louisiana, P. O. Rep. 1854, p. 225, sixteen bushels of seed of Bené plant (*S. orientale*) was sent to a mill in Cincinnati to be manufactured into oil. It yielded thirty-nine gallons of clear oil and about five quarts of refuse oil, or about two and a half gallons to the bushel. In consequence of the mill imparting the flavor of flaxseed he could not use it as a salad oil, for which purpose he was confident it would be superior, when pure, to the adulterated imported olive oil. It was used, however, as a substitute for

castor oil. All who used it praised it for its gently purgative effect, and because it was free from the nauseous taste peculiar to castor oil. Twenty bushels is believed to be a moderate estimate of the amount of the seed produced by an acre. It yields a gallon of oil to the bushel more than flaxseed.

The excellent effect of the leaves steeped in water as a mucilage to be used in diarrhœa and dysentery is testified to by all persons who have used it. For this purpose two or three leaves are soaked in a tumbler of water and administered repeatedly. This plant will act as a substitute for gum-arabic on account of the mucilage it yields. It should be used in the bowel affections of children and among soldiers in camp. Planters should collect and cure all the leaves at their disposal. At page 338 of the same volume another paper on the Bené is to be found. It is there stated that the plant will throw out a profusion of leaves by breaking off the top when it is half grown. The cotton seed also yields a mucilaginous tea, useful as a substitute for flaxseed.

Nelson quotes Miller on the Bené, as cultivated by the African negroes in South Carolina: "The inhabitants of that country make an oil from the seed which will keep many years and not take any rancid smell or taste, but in two years becomes quite mild; so that when the warm taste of the seed which is in the oil, when first drawn, is worn off, they use it as a salad oil and for all the purposes of sweet oil. The seed are also used by the negroes for food—which seed they parch over the fire and then mix with water and stew other ingredients with them, which makes a hearty food." Rural Cyc. Mr. Carlisle ascertained from the Gazette of 1735 that Mr. Garcia established the manufacture of this oil in Charleston as a salad oil; his death in 1738 put an end to the enterprise.

The seeds of the Bené, the myrtle, and the tallow tree, with the fruit of the groundnut, (*Arachis*,) might afford useful material to the soap manufacturers within the Southern States. I will insert here what I have upon the *oleiferous* plants most useful to us in the present exigency. In Boussingault's treatise on the subject of *oils*, pages 135 and 139, he says:

"The following sums may be taken as a pretty accurate estimate of the average quantity of oil yielded by the different oleaginous seeds: colewort, winter rape, and other specimens of

cruciferous plants, from 30 to 36 and 40 per cent.; sunflower about 15 per cent.; linseed (flax) from 11 to 22; poppy from 34 to 63; hemp-seed from 14 to 26; olives from 9 to 11; walnuts 40 to 70; Brazil nuts 60; castor oil beans 62; sweet almonds 40 to 54; bitter almonds 25 to 46; *Modiva sativa* 26 to 28 per cent." I would refer the reader to a more extensive table than this in Ure's Dictionary of Arts. I have little doubt that the Chinese tallow tree, (*Stillingia sebifera,*) introduced and growing around Charleston, is richer than any above mentioned. Hickory nuts, when bearing abundantly, broken and thrown in a vessel of boiling water, would no doubt yield oil abundantly and cheaply for soap. I have, however, upon experiment, found it difficult to extract the oil.

The plants most commonly cultivated for the production of oil belong to the genus *Brassica;* all plants of this genus produce seeds containing considerable quantities of oil, and are sometimes used for obtaining it. All the species are biennial, save the spring colza, or field cabbage, (*Brassica campestris.*) It is not, as some suppose, a degenerated variety of autumnal rape or cole seed, but really a distinct species. "Thaër's Principle of Agriculture," p. 449. In the description by this author of colza and rape, (autumnal varieties,) he lays great stress upon the great value of the colza, (*Brassica oleracea lacineata*, a variety of the garden cabbage,) as perhaps one of the most abundant in the oil it gives out. The rape, a variety of the *Brassica napus*, is less productive. The colza (*Brassica campestris*) requires a dry soil. I introduce this information here because the plant might be cultivated to great advantage at the South for supplying oil, and because Thaër adds at the conclusion of his paper that the seeds of the *ruta baga*, or Swedish turnip, which is already grown extensively here, are equally rich in oil. For the method of culture and gathering, see Thaër's work, published in New York, 1857. It is also an excellent forage plant. The seed does not mature well in this latitude. The oil is obtained by a press or oil mill. Even the spring rape (*Brassica campestris*) yields more than twenty pounds of oil per bushel. Mr. Sanders informs me that the rape is grown and produces well in Clarendon District, S. C., and that it will produce seed.

I would particularly advise the extensive introduction and

cultivation of the rape, both because it grows and matures well, and because of the amount of oil the seeds afford, which would supply whatever is necessary in making soap, (for processes, see Ure's "Dictionary of Arts and Manufactures,") and also because it would allow the Southern planter to devote the tallow, grease, etc., which has been economized for this purpose, to other objects. The Bené probably yields as much oil as any plant we possess, as I am informed by a practical gardener. See, also, flaxseed, Chinese tallow tree, etc.

Mustard seed oil concretes when cooled a little below 32° Fah. The white or yellow seed (Ure's Dictionary of Arts and Sciences, p. 285) afford thirty-six per cent. of oil, and the black seed eighteen per cent. I would refer the inquirer to Ure's Dictionary for paper on the subject of the oils, mode of obtaining, etc.; and to Kurten's work on the "Art of manufacturing Soaps, including the most recent discoveries—with receipts for making camphene oil, candles, etc. Phil.: Lindsay & Blakiston, 1854." This treatise gives very plain directions concerning the articles necessary.

In Ure's Dictionary a plan of an oil mill is given, and information on "seed crushing" and extraction of all oils. He says that the oil of colza is obtained from the seeds of the *Brassica campestris* to the amount of thirty-nine per cent. of their weight. "It forms an excellent lamp oil, and is much employed in France." Hemp-seed oil resembles the preceding, but has a disagreeable smell and a mouldish taste. It is used extensively for making both soaps and varnishes. Linseed oil is obtained in greatest purity by cold pressure, but by a steam heat of 200° Fahr. a very good oil may be procured in larger quantity. "The proportion of oil," Ure adds, "usually stated by authors is twenty-two per cent. of the weight of the seed, but Mr. Blundell informs me that by his plan of hydraulic pressure he obtained from twenty-six to twenty-seven." In the Encyc. Metropolitana, under "Oil-press," a quarter of seed (whose average weight is four hundred pounds) is said to yield twenty gallons of oil. Now, as the gallon of linseed oil weighs 9.3 pounds, the total product will be one hundred and eighty-six pounds, which amounts to more than forty-five per cent., an extravagant statement, about double the ordinary product in oil mills, etc., etc. When kept long cool, in a cask partly open,

it deposits masses of white stearine along with a brownish powder. This stearine is very difficult of saponification. The reader is referred to the last paragraph of p. 297 of Ure's Dictionary, vol. ii, and all of p. 298, ending at word "Dutch plan," p. 299; and on the subject of oils, soap, candles, starch and sugar, I would refer to the same work, where many of the best processes are described.

Chaptal, in his Chemistry applied to Agriculture, makes the following practical remarks on oils: "The oils are fat, unctuous bodies, of various degrees of fluidity, insoluble in water, forming soap with the alkalies, and burning and evaporating at different temperatures. It is the last characteristic particularly which establishes that difference among them by which they are divided into fixed and volatile oils. The fixed oils are contained in seeds and fruits, from which they are extracted by pressure. The first portion which is expressed is the purest, and is known by the name of virgin oil; that which follows is rendered more or less impure by the mixture of other principles contained in the fruit submitted to compression. It is particularly by the mucilage, which is found in greater or less quantity in all vegetables, that the purity of oil is affected. After all the oil which can be extracted by pressure has been drawn off, it is customary to moisten the mash with boiling water and to subject it to another and more powerful pressure; but the oil thus obtained carries with it a large portion of mucilage, and is usually employed only in some of the trades. In some countries it is customary to collect the fruits into heaps and to subject them to a degree of fermentation before pressure; by this means the extraction of the oil is rendered easier and the quantity of it is increased, but the quality of it is much injured. Similar results are obtained by breaking the fruit previous to expressing the oil. It would be hardly right to condemn these last methods as erroneous, because in the numerous soap-works, dye-houses, cloth manufactories, etc., this quality of oil is preferred to that which is purer. The learned will do well to condemn the processes now employed for procuring the fine oils, and to present others by which we may obtain them purer and of a better taste; but the grand consumption of the oils is in the manufactories, and there the fine oils would but imperfectly replace those of a coarser kind;

thus, by perfecting the produce the usefulness of it would be lessened. When oil is to be extracted for domestic purposes it is without doubt desirable that it be obtained as pure as possible, but that which is destined to be employed in the trades and in manufactures, as in that of soaps for example, is the better for being combined with a portion of mucilage. The great art of manufacturing consists in appropriating the products to the wants and tastes of consumers. When mucilage is so abundant in an oily seed that it yields upon expression only a pasty combination of mucilage and oil, the seed is dried by fire; when the mucilage is thus deprived of fluidity the oil flows off pure. In this manner the seeds of flax, of poppies, of henbane, etc., are prepared for expression. Nearly all the oils are colored, and contain some of the principles of the fruits from which they are procured; these are in some of their effects injurious to the oil, and great pains have been taken to find some means of freeing it from them. Oil is clarified to a certain degree merely by standing in a cool place in open earthen vessels; it forms a deposit, and is thus rendered purer, clearer and better. If oil is exposed to the sun it gradually loses its color. In order to clarify the oil of mustard one per cent. of sulphuric acid is put into a large earthen pan into which the oil is thrown and carefully stirred; the oil becomes green, and upon being allowed to remain at rest forms upon the sides and bottom of the pan a blackish deposit, which is principally composed of carbon; the process must be repeated after a few days if the oil has not acquired the wished for clearness. But before using the oil it is necessary that it be allowed to remain for some time undisturbed. In this operation the mucilage appears to be precipitated and consumed by the acid. Most fixed oils contain some mucilage, and most of them become rancid.

"Most fixed oils have but in a very slight degree the property of drying, but some of them acquire it by being combined with some metallic oxide, and this greatly increases the use of them, as they can in this way be employed as varnishes for covering bodies which it is necessary to preserve from air and water, or as the recipents of colors to be used in painting upon cloth, wood or metal. The best drying oils are those of flaxseed, nuts and poppies. Linseed oil will dissolve at boiling tempera-

ture one-quarter of its weight of that oxide of lead known in commerce by the name of litharge. It becomes brown in proportion as the oxide is dissolved; when saturated with the oxide it thickens by cooling, and it is necessary to render it liquid by heat at the time of using it. In consequence of the numerous purposes to which the fixed oils are applied the consumption of them is immense; they form the basis of the soaps, both soft and hard, according as they are combined with potash or soda; they are used to fix in the most durable manner upon cotton the colors obtained from madder; they are employed to facilitate the operations in all establishments for carding and spinning wool. It is by the use of oil that the play of all machinery is rendered more regular and easy, and that friction is moderated, and by it metals are preserved from rusting. The most important use to which oil has been applied is that of lighting buildings, the defects of the light being remedied by argands and other lamps which aid in the consumption of the carbon by admitting more air to the wick.

"The volatile oils do not belong exclusively to any one part of plants; in some, as in the Bohemian angelica, the oil is distributed throughout the whole plant; sometimes, as in balm, mint and wormwood, it is found in the leaves and stalks; the elecampane, Florence iris and bennet contain it in their roots; thyme and rosemary in their leaves and flower buds; lavender and the rose in their calyces; chamomile, lemon and orange plants in their flowers; the petals and the rind of the fruit of the two last abound in oil; that of the indigo and fennel is contained in vessels forming the raised lines which may be perceived on the bark. Volatile oils vary in color, consistency and weight; there are some, as those of sassafras and the clove, for instance, which are heavier than water; and there are some, as those of the rose and parsley, that remain in a concrete state at the usual temperature of the air, etc.

"The volatile oils are extracted either by distillation or expression. When the oil is contained in vesicles upon the surface of the rind, as in those of the lemon and bergamot, the cells may be broken and the oil caused to flow out by merely rubbing the rinds together; or the rinds may be taken off by grating, and the oil separated from the pulp by a light pressure, or by allowing the whole to remain undisturbed for a few days, when

the pulp will settle at the bottom and the oil remain floating above it. When these rinds are scraped with a bit of sugar, the oil combines with it, forming an *oleo-saccharum*, useful in giving a pleasant flavor to liquors."

Count Chaptal gives this simple process for extraction of oils: "With the exception of the oils of which I have just spoken, all the volatile oils are extracted by distillation; in this process the plant is put into the boiler of the alembic and covered with water; when the water boils the oil rises with the steam, and is condensed with that in the worm of the still, whence they flow together into the receiver; the oil which swims upon the top is separated from the water, and this water, which has a milky appearance, is again employed from preference in new distillations. It is customary to make use of a narrow straight-necked vessel as a receiver; the oil collects in the upper part of this, while the water passes off through a siphon in the side about four inches below the neck. In the south of Europe where great quantities of the volatile oils are prepared, the distillers place their portable apparatus in the open air, in those places which offer a plentiful harvest of aromatic plants; when these are exhausted they remove elsewhere.

"The aromatic oils are employed particularly as perfumes, and for this purpose are often combined with other substances. They are likewise used in the manufacture of varnishes, from the readiness with which they dissolve colors, and from their quick evaporation after being applied."

At Cannes, in the south of France, I have witnessed the operations for extraction of essence of roses, which are planted in great abundance. On the plantations in South Carolina rose-water is distilled from the petals of the sweet rose by a simple process. M. Dussauce, chemist to Tilden & Co.'s establishment at N. Lebanon, N. Y., has published, 1868, a Practical Work on the Manufacture of Perfumery, Oils, etc.

BIGNONIACEÆ. (*The Trumpet-flower Tribe.*)

TRUMPET FLOWER, (*Bignonia crucigera*, Walt., N. A. F. *Bignonia capreolata*, L. and Ell. Sk.) Rich, shaded soils; collected in St. John's; vicinity of Charleston. Fl. March.

Shec. Flora Carol. 278. See *B. crucigera*, Walt. The root

and vine, in infusion or decoction, answer the purpose of sarsaparilla. It is detergent and alterative, aperient, diuretic and sudorific, used in syphilis, chronic rheumatism, and in derangements arising from impurities of the blood. The pith is said to be divided longitudinally into four equal parts, so that when the stem is cut transversely it exhibits the appearance of a cross, and hence Walter's name. This vine appears to be possessed of instinct; it shoots up to the highest tops of trees before sending out a branch.

CATALPA, (*Catalpa bignonioides*, Walt. *Bignonia catalpa*, Mx. *Catalpa cordifolia*, Ell. Sk.) Grows in the upper and lower country of South Carolina; collected in St. John's. Fl. May.

Mér. and de L. Dict. de M. Méd. Supplem. 1846, 107. The physicians at Naples, after the favorable report of Thunberg and Kæmpher, as well as those of Brera, have given incontestable evidence of the advantages resulting from its use in asthma. The decoction of the fruit is also employed. See Gazette Médicale, 8, 1834; Journal de Chim. Méd. x, 164. Kæmpher says he also applied the leaves, which are emollient and anodyne, to the painful part. A decoction of the pods has been recommended in pectoral complaints, and the dried seeds smoked like tobacco, have proved useful in asthma. The bark is said to be vermifuge and the wood emetic. Griffith. Poultry are said to thrive on and to be fond of the seeds. The timber makes durable posts. The honey collected from the flowers is somewhat poisonous—resembling, though less active, that collected from the yellow jessamine; and an unpleasant and poisonous gas is said to be emitted from the wounded bark.

YELLOW JESSAMINE, (*Gelseminum sempervirens*, Juss.) Grows in swamps; diffused through the alluvial regions. It is observed that it is gradually gaining ground in the upper country. I have noticed it just beyond Columbia, and near Norfolk, Va.

Ell. Bot. Med. Notes, 312; Frost's Elems. Mat. Med. 490. "Possessed of narcotic peoperties to a very considerable degree." A spirituous tincture of the root is used with success in rheumatism. It is also employed in gonorrhœa; ninety drops of the bark of the root in tincture, taken in three doses, produce vertigo, perverted vision, etc. Its marked effect on the nervous system has been repeatedly observed. It also acts as an arte-

rial sedative without producing nausea or purgation, and though causing insensibility to pain, when taken in large doses, it does not induce stupor or delirium.

The root of the jessamine has been much more freely used since the publication of my report on the Med. Bot. of South Carolina, made to the Am. Med. Association, 1849. Special articles can be found descriptive of its uses in the Charleston Medical Journal. Dr. Mayes, of South Carolina, has contributed one of these, March, 1857. Dr. Nash, of Norfolk, has also used it in many cases of fever with the most desirable results. Four ounces of the fresh root are added by Dr. Mayes to one pint of diluted alcohol; dose, twenty to fifty drops repeated every two or three hours. Drs. Ford and White used the tincture of the root as they did that of the *Veratrum viride* in yellow fever, for its depressing influence upon the circulation; see Ch. Journal. Many employ the tincture of the root in fevers; it acts in a manner similar to digitalis and *V. viride*, with the addition of some narcotic property. It has to be used with caution on these accounts, and because it induces delirium in overdose. Stillé's Therap. and Dunglison's New Remedies may be consulted. My venerable friend, Dr. John Douglass, of Chester, S. C., writes me that he has used it repeatedly with advantage in gonorrhœa; see his letter published in Ch. Med. Journal. The tincture forms a valuable ingredient in cough mixtures, particularly in those cases where a nervous sedative is required. It has been repeatedly prescribed in these cases by Dr. O. A. White and others during the war. Dr. Edward Porcher, of Mars Bluff, S. C., prescribes the tincture in doses of twenty drops with much success in neuralgia.

In the Med. Press. and Circular, 1867, Dr. R. P. Davis, of Virginia, reports two cases of poisoning by overdoses of the fluid extract of gelseminum; one died two hours and a half after taking the poison, having had widely dilated pupils, spasmodic breathing, a cold and congested surface, pulse almost imperceptible, and being totally unconscious. The other a gentleman who had also taken about a tablespoonful of Tilden's extract, had an emetic administered to him more promptly and recovered. The emetic was followed by one drachm of quinine in four ounces of wine. When first seen this patient was found in the following condition: He was lying on his left side, face

somewhat congested, pupils dilated but responding to the different degrees of light, eye-lids half closed with apparent inability to move them, and lower jaw drooping, and his tongue, to use his own expression, so thick that he could hardly speak; his skin was warm and moist, pulse small and feeble, and respiration somewhat diminished in number. He had neither purging nor vomiting. Dr. Parker gave quinine, and in a large dose, because it was a cerebral stimulant, and he thinks it was useful because the patient had taken the Gelseminum nearly ten hours before he took the emetic, giving the system time to come under its influence.

The tincture or extract of this plant would, no doubt, be found useful in most cases of fever and inflammations, to reduce arterial action. In Tilden's Jour. of Mat. Med. July, 1867, Dr. R. W. Slaughter communicates the following antidote: "A gentleman who had resided in Brazil, where the natives use the gelseminum as a specific for fever, asserts that the symptoms caused by an overdose will immediately pass off if a teaspoonful or two of the expressed juice of the *Thuja occidentalis*, arbor-vitae, be given."

In reply to some queries addressed to Dr. J. A. Mayes, of S. C., 1868, who has extensively used the Veratrum and Gelseminum, I received the following statements:

"I used the gelseminum in form of tincture very much as a sedative to an excited nervous system, and locally for relief of neuralgia, in situations where it could be properly applied.

"For trismus nascentium, I found the tincture of gelseminum more successful than any remedy I ever used. I never lost a case in which it was freely used. Had a case of tetanus been met, I should have prescribed it with much confidence. For the former, I gave it in doses of three drops every half hour or an hour, according to the frequency of the spasms, and continued it with gradually lengthening intervals until the spasms ceased altogether. For tetanus I had long made up my mind to test it fairly by giving thirty to fifty drops every hour, until blindness was superinduced, hoping to see the disease overcome when the system was fairly saturated with the gelseminum.

"A poultice, made by boiling a quantity of gelseminum roots until a strong decoction was obtained, and then adding corn meal to give it consistency, applied warm to acute, painful

swellings, to the jaws for neuralgia or rheumatic toothache, and for various local pains, was found, during the war, to be a valuable substitute for opiate applications. I have seen very great relief obtained in a few minutes in severe neuralgic pains of the side of the face."

For reference to authorities see U. S. Disp., 12th Ed.; Charleston Med. Jour. March, 1854, and xii, 180; also an abstract of the various papers by Dr. J. Bell, in N. Am. Med. Chir. Rev. September, 1858.

The active principle, *gelseminine*, is much used latterly by a school of practitioners at the North and West, with other substances of similar nomenclature.

I give the following statement of the method of extracting the perfumed oil of flowers, as it may enable those living where the jessamine, rose, violet and other flowers bloom in such abundance, to prepare it: "The essence of rose, of jessamine, violet, etc., are possessed of a more feeble odor, and being obtained from the flowers of their respective plants, require much care in their preparation. This is done by spreading upon white wool, impregnated with olive oil, the petals of the flowers, and leaving them for some time covered over with a woollen cloth, upon which flowers are also scattered. The flowers are renewed from time to time, until the olive oil employed appears to be saturated with the oil of the flowers, when this last is separated by digesting the wool in alcohol." Wilson's Rural Cyc.; consult, also, Ure's Dictionary of Arts, and Chaptal's Chemistry applied to Agriculture; also Bené (*Sesamum*) in this volume. I have seen in the south of France young girls manufacturing the essences of rose and orange flowers. Our Southern matrons do not lack jessamine flowers or rose petals for making perfumes, essences, rose-water, etc.

VALERIANACEÆ. (*Valerian Tribe.*)

Valeriana scandens, L. East Florida. Chap.

We have also *V. pauciflora*, Mx. Growing on mountains of Tennessee. They should be examined on account of their relations with the officinal valerian, and as nervous stimulants.

ACANTHACEÆ. (*The Justicia Tribe.*)

Ruellia strepens, L. Grows in pine barrens; collected in St. John's; vicinity of Charleston. Fl. July.

Ainslie, ii, 153; Lind. Nat. Syst. Bot. 285. The leaves are said to be subacrid.

OROBANCHACEÆ. (*The Broom-rape Tribe.*)

SQUAW-ROOT; CANCER-ROOT; BROOM-RAPE, (*Orobanche unifora*, L.) Grows in pine barrens in the middle districts.

U. S. Disp. 1282. It is said to possess properties similar to the following:

BEECH-DROP, (*Orobanche* Virginiana, L. *Epiphegus Americana*, Nuttall.) Grows on beech trees exclusively; vicinity of Charleston; Newbern. Fl. August.

U. S. Disp. 128. It has a bitter, nauseous, astringent taste, diminished by drying; it is given internally in bowel affections. Dr. Barton thought it was one of the ingredients of a secret remedy for cancer, known as Martin's cancer powder. This is supposed to possess some of the powerful astringency belonging to the *O. major*. Michaux says that in Virginia they use the powder in inveterate ulcers and cancers. Lind. Nat. Syst. 288; Bart. Med. Bot. ii, 38; Mér. and de L. Dict. de M. Méd. iv, 102.

Orobanche Americana, L. Collected in St. John's in rich soils; vicinity of Charleston. Fl. July.

This has been also used as a remedy in carcinomatous affections, ulcers, etc.

SCROPHULARIACEÆ. (*The Figwort Tribe.*)

Generally acrid and bitterish, sometimes dangerous in their properties.

MULLEIN, (*Verbascum thapsus*, Walt.) Diffused; grows in pastures, upper and lower districts. Fl. July.

Le. Mat. Med. ii, 446; Pe. Mat. Med. ii, 295; U. S. Disp. 735; Watson's Pract. Physic, 202; Royle, Mat. Med. 493; Journal de Chim. Med. ii, 223; Home, Clin. Experiments and Hist.; Bergii, Mat. Med. i, 118; Mér. and de L. Dict. de. M. Méd. vi, 864; Bull. des Sc. Méd. de Férus, xvi, 341. The leaves of the flowers contain a narcotic principle; a decoction of the flowers and leaves as tea, is beneficial in dysentery and tenesmus; it calms pain in the fundament caused by hemorrhoids; and it is used in the

convulsions of infants, in ardor urinæ, and wherever the indication is to moderate spasm or irritation. A large quantity of the flowers will even induce sleep, so active is the narcotic principle it contains. Dém. Élém. de Bot. ii, 135; Milne, Ind. Bot. 293. The leaves of mullein, warmed and applied to the feet, have given relief to those affected with gout; and the distilled water of the flowers has been used effectually in diseases of the skin; Mérat says in erysipelas and colics. Scopoli relates that in Carolina mullein is esteemed valuable in the pulmonary complaints affecting cattle, (hence called cow's lungwort.) "The roots, both recent and dried, have the property of fattening poultry, even to obesity." Thornton's Fam. Herbal. 238. It is useful in stopping or diminishing diarrhœas of long standing, and often in easing pain of the intestines, which is accounted for by the anodyne, emollient and gently astringent qualities of the plant. Woodv, Med. Bot. ii, 343. Linnæus states, in his Veg. Mat. Med. 31, that fish will become so stupefied by eating the seeds as to allow themselves to be taken. See, also, the *Æsculus pavia*, which possesses similar powers. Dr. Wood refers to its value in pectoral diseases, coughs, etc. U. S. Disp. 736. The leaves, steeped in hot water, are applied externally as a feebly anodyne emollient dressing for sores, for the relief of headache and frontal pains, used as an injection in tenesmus and applied locally in pains, and are much used by the poorer class. An ointment may be made by boiling the leaves in lard. A friend informs me that the mullein leaves dried and smoked as tobacco relieve asthmatic paroxysms, which is not unlikely in view of their narcotic properties. The down serves for tinder; no animal will eat it. Equal parts of mullein leaves and the bark of the root of sassafras boiled in water and concentrated, then mixed with powdered sassafras bark to form pills, are reputed valuable in the treatment of agues by the herbalists. See "Indian Guide to Health."

Surg. Hinckley has reported several cases in which the paroxysms of intermittent fever were completely prevented by the administration of the warm infusion of the fresh root. Four ounces of the fresh root to one pint of water reduced one-half by boiling, of which two ounces were given every hour, commencing four hours previous to the expected chill. Confed. S. Med. J., January, 1864. Dr. N. R. Newkirk, of N. Jersey, in-

formed Prof. Wood that he had found the smoking of dried mullein leaves useful in aphonia from irritation of the larynx. Taken internally, the dose is four ounces, one ounce of the leaves being added to one pint of water. It would be desirable to obtain an analysis of this plant, and it should be more carefully examined.

Verbascum lychnitis, L. Grows in South Carolina, according to Dr. Muhlenberg. Fl. July.

Dém. Élém. de Bot.; Mér. and de L. Dict. de M. Méd. vi, 863. The root has been used in jaundice. Durand gave an extract of the leaves in this disease, in pectoral affections, and in colics; no doubt beneficial, from its sharing the possession of the narcotic principle ascribed to the *V. thapsus*.

Griffith states that the flowers are said to destroy mice. Med. Bot. 517.

MOTH MULLEIN, (*Verbascum blattaria.*) Grows abundantly, according to Elliott, in the middle and upper districts; sparingly in the lower; collected in St. John's, at the Big Camp, on the Santee Canal. Fl. March.

Mér. and de L. Dict. de M. Méd. vi, 863.

FIGWORT, (*Scrophularia nodosa*, Linn. Prodrom. *Scrophularia Marylandica*, Ell. Sk.) Vicinity of Charleston.

The leaves have a rank fetid smell, and a disagreeable, bitter taste. The root has also a nauseous odor. They yield their properties to water and alcohol, and contain a bitter resin, an extractive having the odor of benzoic acid, with gum, starch, *inuline*, etc. Pereira, ii, 306; Griffith Med. Bot. 518. It is vulnerary and soothing, when applied as a poultice to ulcers, burns, piles, itch, etc. An ointment of the leaves was officinal in the Dublin Pharmacopœia, and was found useful by Stokes and Montgomery in skin diseases.

SNAKE-HEAD, (*Chelone glabra*, L.) Grows in damp soils; Richland District; collected in St. John's Berkeley; vicinity of Charleston; Newbern. Fl. July.

Griffith Med. Bot. 520. In small doses it is laxative; large quantities purge. It acts on the liver; one drachm of the powder may be given at once. It is administered by the vegetable practitioners as an anthelmintic; also in jaundice, in hepatic disorders generally, and in constipation. It is pre-

scribed as an alterative and tonic in impure conditions of the blood—the decoction, powder, or tincture used.

DIGITALIS; FOXGLOVE, (*Digitalis purpurea.*)

It is stated in one of the gazettes that this plant grows native around Charleston. See Shec. Flora Carol. 305. Elliott makes no mention of it; neither does Bachman in his Catalogue. The power this remarkable species possesses of diminishing the force of the circulation is well known. It sometimes proves violently emetic and purgative. See authors.

HEDGE HYSSOP, (*Gratiola officinalis. Gratiola Virginica* of Mx. and Ell. Sk.) Natural. Abundant along the margins of ditches; vicinity of Charleston. Fl. April.

Bull. Plantes Vén de France, 118. It is purgative and emetic; like the Arum, however, it loses much of its virtue when dried; a small quantity of the fresh root will purge excessively, (des superpurgations extrémement dangereuses.) It was used, says Lieutaud, as a hydragogue cathartic, sixty grains of the dried root being given in dropsy and intermittent fever. Thornton's Fam. Herbal. 23. It is also said to be powerfully anthelmintic, and was highly spoken of by the celebrated Boerhaave, by Hoffmann, and Dureau. "Relieves dropsy in the chest." Lind. Nat. Syst. 291. According to Vauquelin, the purgative property depends upon a peculiar substance analogous to resin, but differing from it in being soluble in hot water. Dr. Whiting has announced the existence of *veratria* in it, which accounts for its active properties. It formed an ingredient of the celebrated eau medicinale for gout. Dose of powder fifteen to thirty grains; of the vinous tincture, forty to fifty drops; of the infusion of an ounce of dried plant to a pint of boiling water, half an ounce to an ounce.

GOLDEN GRATIOLA, (*Gratiola aurea*, Muhl.) Vicinity of Charleston.

Griffith Med. Bot. 519. It is said to be fully as powerful as the above, as a substitute for which it is employed; attention is called to it.

Herpestis monnieria, Kunth. *Herpestis cuneifolia*, Ph. Ditches, Fla. to N. C. and westward.

The juice is considered a good embrocation when mixed with petroleum, in rheumatic complaints. Griffith.

YELLOW GERARDIA, (*Dasystoma pubescens*, Benth. *Gerardia Flava*, L. and Ell. Sk.) Abundant in rich, dry woods.

This plant, it is said, will prevent the attacks of yellow and other flies upon horses; probably owing to its great viscidity. See "*Juglans*." It is pubescent and highly viscous. It has very little taste, unless chewed for some time. Upon a subsequent examination (1862) of the *G. Flava*, I find that the hairs with which the plant is covered secrete from the gland at their summits a tenacious, gummy substance, to which insects may adhere. Under the microscope it is an interesting object. The leaves of the English elder (*Sambucus nigra*) "kill several species of noxious insects, offend and banish moles, and are greedily eaten by sheep." Our *Lysimachias* should be examined, as the leaves and flowers of *L. nummularia*, steeped in oil, have the power of destroying insects and worms which infest granaries.

PURPLE GERARDIA, (*Gerardia purpurea.*) Common in wet places.

A wineglassful of the decoction repeated is said to be highly serviceable in "diseases of the kidneys;" largely used in some portions of S. Carolina. It is said to give great relief.

SPEEDWELL, (*Veronica officinalis.*) Grows in South Carolina, according to Pursh. Fl. May.

Linn. Veg. Mat. Med. 1. This is tonic and pectoral; used in asthma and coughs, four spoonsful of the expressed juice being given in the form of tea. Indig. Bot. 18. The infusion of the leaves is employed on the west coast of Africa as a drink in gravelly complaints. Drs. Frank and Scopoli wrote monographs on it; the latter affirms that he cured a very violent case, where suffocation arose from catarrhal affection, by introducing through the mouth, by a funnel, the vapor of a decoction of *Veronica*, mixed with vinegar. It contains tannin. Mér. and de L. Dict. de M. Méd. vi, 875; Flore Méd. vi, 345. It is alluded to in the U. S. Disp. as a diaphoretic, diuretic and expectorant, which had passed out of use. Griffith refers to it as a mild astringent. Many of these plants only require examination to regain the confidence once placed in them; all being liable to the fluctuations which have characterized some that are now considered our most valuable agents.

To the above, published in the first edition of this volume, I add the following from the 12th Edition U. S. Disp.: Exam-

ined by Euz, this plant is found to contain in the fresh juice and an extract from the herb, a bitter principle, soluble in alcohol, but scarcely so in ether; an acrid principle, red coloring matter; a variety of tannic acid, a crystallizable fatty acid, with malic, tartaric, citric, acetic and lactic acids; a soft, dark, green, bitter resin and mannite. Prof. Mayer, of New York, found evidence of the existence of an alkaloid and a small quantity of a saponaceous principle. (Am. J. Pharm., July, 1863.)

NECKWEED, (*Veronica peregrina*, Mx.) Vicinity of Charleston; Newbern.

Griffith's Med. Bot. 517. In some portions of the United States it is supposed to be very efficacious; and is used internally and externally as a wash in scrofulous tumors on the neck.

VIRGINIAN VERONICA; CULVER'S ROOT, (*Veronica Virginica*, L. *Leptandra*, Nutt.) Grows in the mountain valleys. Fl. August.

U. S. Disp. 772; Mér. and de L. Dict. de M. Méd. vi, 816. The root is bitter and nauseous, yielding its active properties to boiling water. In the recent state it is said to act violently, sometimes as a cathartic and sometimes as an emetic.

Under the name Blackroot, Culver's root, and the probably erroneous botanical name, (*Leptandra alba*,) the author of a work professing to describe the Indian mode of treating diseases, entitled the "Cherokee Physician," recommends the plant as an efficient purge, "operating with mildness and certainty;" peculiarly adapted to typhoid and bilious fevers. Dose, a large teaspoonful of the root in a gill of boiling water, repeated in three hours. It is said to be also diaphoretic. The root may be given in any shape, and is thought to have a slow, alterative action. An extract is also used in making cathartic pills by concentrating the decoction, and using starch or liquorice root powder, or a syrup is made by adding molasses or sugar. It is laxative in tablespoonful doses. A principle called *leptandrine*, from the *Leptandra*, is much used in the Western States. An emetic decoction is made by the vegetable practitioners with the *Leptandra* root: half a pound American ipecacuanha, or the Indian physic one pound, put into a gallon of water and boiled down to a pint, of which the dose is an ounce every twenty minutes till vomiting is induced; or two teaspoonsful of the

powder may be given in an ounce of boiling water, to be repeated.

Since the above was written the value of the plant has been more fully recognized, and it has been placed in the primary list of the U. S. Pharmacœpia. I obtained additional information (1868) from the U. S. Disp., 12th Ed. Water and alcohol extract the virtues of the root. According to Mr. E. S. Wayne, of Cincin., it contains volatile oil, extractive, tannin, gum, resin, and a peculiar crystalline principle to which the virtues of the plant may be ascribed. To this, says Dr. Wood, the name *leptandrin* properly belongs. The resinous matter obtained by making a tincture of the root precipitated with water has been improperly called leptandrin. (Proc. of the Am. Pharm. Assoc.) Dr. Wayne also obtained a principle having the properties of mannite. (Am. J. Pharm., 1859, 557.) The root acts both as an emetic and cathartic. The "Eclectics" use it as a chologogue, and the impure resin, which they call leptandrin, and the root itself, they employ as a substitute for mercurials. The The dose of the powder is from twenty grains to a drachm; that of the impure resin is from two to four grains. Prof. Proctor, adds Dr. Wood, has prepared a fluid extract which, probably, contains all its virtues, and may be given as an aperient chologogue in the dose of from twenty to sixty minims. (Am. J. Pharm., March, 1863.)

BROOK PIMPERNEL; LONG-LEAVED BROOK-LIME, (*Veronica anagallis*, Mich.) Grows in South Carolina, according to Pursh. Nat. Fl. July.

Dém. Élém. de Bot. ii, 130. The infusion is diuretic, antiscorbutic and vulnerary.

Scoparia dulcis, L. S. Fla. Chap.

An infusion is used in S. America as a febrifuge and in hæmorrhoidal affections. Griffith.

SOLANACEÆ. (*The Nightshade Tribe.*)

Leaves are narcotic and exciting—tubers generally wholesome.

PEPPER, (*Capsicum annuum.*) Cultivated.

Its properties are well known. Cayenne and other peppers may be used as external irritants in place of mustard. Our

Capsicum frutescens, L., growing in S. Fla., should be examined, for the most active of these plants are either this identical species or varieties of it. They contain *capsicin* and are used to produce revulsion to the surface or as excitants of the stomach, also in fevers and affections of the throat. *C. baccatum* and *C. frutescens* are said to yield most of the Cayenne pepper brought from the West Indies and S. America, and Ainslie informs us that the latter is chiefly employed in the East Indies. U. S. Disp.

DEADLY NIGHTSHADE, (*Solanum nigrum*, L.) Grows in rich soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Trous. et Pid. Mat. Méd. i, 206; U. S. Disp. 304; Eberle, Mat. Med, ii, 89; Ed. and Vav. Mat. Méd. 343; Royle, Mat. Med. 495; Pe. Mat. Med. and Therap. ii, 326; Le. Mat. Med. ii, 272; Mér. and de L. Dict. de M. Méd. vi, 417; Journal de Chim. Méd. iii, 422 and 541; Nouv. Journal de Méd. x, 67; Alibert, Nouv. Éléms. de Thérap. i, 417. The berries are an active narcotic poison; one grain of these, in augmented doses, is used as a remedy for increased flow of urine. It is indicated in diseases affecting the bladder, rebellious ulcers, etc. Milne, Ind. Bot. 315; Bull. Plantes Vén. de France, 155; Dém. Élém. de Bot. ii, 139. When swallowed, headache, violent distortion of limbs and delirium supervene. Rucke mentions a case of a family having eaten the leaves, and being attacked with swelling of the face, accompanied with burning heat, followed by gangrene. Forskall, in his Flora Ægypt. Arabica, says that an application of the bruised leaves acts as a specific in the disease termed by the Arabs bulla, and, applied with hog's lard, cures whitlows. Cæsalpinus states that the juice, or a decoction, proved useful in inflammation of the stomach. Gataker, in his "Observations on the Use of the Solanum," commenced by giving a grain, which acted gently as an evacuant by sweat, urine and stool; if the dose was too large, it produced vomiting, profuse perspiration, or too copious a discharge by the kidneys, or diarrhœa, and sometimes dimness of sight, vertigo, etc. He used it frequently in nervous affections, obscure pains and dropsy. Stearns' Am. Herb.; Mér. and de L. Dict. de M. Méd. The leaves, beat up into a poultice, are applied to painful parts, hemorrhoids, etc., and as a cataplasm in spasmodic retention of

urine, and in catarrh of the bladder, no doubt producing beneficial results by its narcotic properties. Combined with bread, or bruised and applied alone, it eases headache and pain in the ears, helps inflammation of a venereal kind, pains from cancerous tumors, and is applied with advantage in herpetic, syphilitic and scorbutic eruptions. Given internally, one half-grain infused in one ounce of boiling water may be used. See, also, Linnæus, Veg. Mat. Med. 34; Flore Méd. v, 239. It was mentioned by Dioscorides, iv, 56. By the analysis of Desfosses, the berries furnish an alkaloid called *solanine*, possessed of marked properties. Nouv. Journal de Méd. x, 67; Journal de Chim. Méd. iii, 541. Dunal says it induces dilation of the pupil by friction, as completely as it is accomplished by belladonna. Anc. Journal de Méd. vi, 150; Hist. Méd. des Solane, by Dunal. It has been doubted whether it produces any impression upon epileptic patients. Botanique Méd. 292. The fumes arising from the burning of the fresh fruit are valuable in curing toothache. Gazette of Health, May, 1824. The juice furnishes a reactive agent, which indicates at the same time acids and alkalies, according to S. Boullay, Bull. des Pharm. ii, 576; and in the Observs. on different English species by Broomsfield. See, also, Desfosses, Chem. Anal. of the narcotic principle, followed by some cases illustrating the action of that principle; Révue Méd. iv, 463. Griffith Med. Bot. 482, says that it appears to possess the same properties as the *S. dulcamara*, but in a greater degree; accounted for by the fact that *solanina* exists in it in larger proportion. Orfila found the extract equal in power and energy to that of lactuarium. Toxicol. Gén. ii, 190. It may be employed in the same description of cases as the bittersweet. Eberle thinks it is by far too much neglected.

M. Dunal, of Montpelier, states as the result of numerous experiments, that the berries are not poisonous to man or the inferior animals; and the leaves are said to be consumed in large quantities in the Isle of France as food, having been previously boiled in water. U. S. Disp., 12th Ed.

HORSE-NETTLE, (*Solanum Carolinense*, Michaux.) Diffused; collected in St. John's Berkeley, in pine barrens; vicinity of Charleston; Newbern. Fl. August.

Mér. and de L. Dict. de M. Méd. vi, 410. Valentine employed it in tetanus, (non traumatique.) The juice of five or six

berries was used, augmenting the dose from day to day. See "A notice of the different methods of treating tetanus in America, with observations on the good effects of *S. Carolinense*," (in French.) Journal Gén. de Méd. xl, 13. They did not have it in sufficient quantities to repeat the experiment; with us it is abundant. It possesses some reputation among the negroes in South Carolina as an aphrodisiac.

Salanum mammosum, Pursh. Fla.; Ga.; vicinity of Charleston.

Lind. Nat. Syst. 295. The decoction of the root is bitter, and is esteemed a valuable diuretic. Ainslie, M. Med. 291; Griffith Med. Bot. 483. It bears a large and poisonous fruit, which is said to contain *malate* of *solanina*. Its extract, in small doses, has been given in cardialgia, lepra, etc. Flore Méd. Antill. iii, 159.

Solanum Virginianum, Pursh. Grows in sandy soils; vicinity of Charleston. Fl. July.

Stearns' Am. Herbal. 154. The leaves are anodyne; the juice of the whole plant is sharp and corrosive, and inspissated in the sun to the consistence of an ointment, is applied to cancers and ulcers. "The plant is good in rheumatic affections, and in those proceeding from venereal taint—surpassing opium." It has also been found serviceable in itch and herpes. From this statement, it appears to resemble in its properties the *S. nigrum*, of which it is considered a variety.

IRISH POTATO, (*Solanum tuberosum.*) Cult. It is said to have been originally carried to Europe from Virginia. Baldwin found it growing wild in Peru.

Dém. Elém. de Bot. ii, 142. The juice of the leaves is said to be an excellent diuretic. "Nous avons remarqué que les enfans de nos provinces, nourris avec ces racines, ont le ventre gros, dur, et sont sujets à des glandes tuméfiées!" Lind. Nat. Syst. Bot. 295, where it is mentioned that the root, in a state of putrefaction, is affirmed to give out a light sufficient to read by. Macculloch said potash could not be obtained from the stalks, though it exists largely in the plant. Griffith's Med. Bot. 483. An extract of the leaves is highly spoken of by Mr. Dyer in chronic rheumatism, and in painful affections of the stomach and bowels; he thinks it ranks between conium and belladonna. Pharm. Journal, i, 590. The leaves, stalks, and unripe berries are asserted to be narcotic; and an extract from the leaves is

used in coughs and spasmodic affections, in which it is said to act like opium. From a half grain to two grains is the dose. Geiger; U. S. Disp. Dr. Worsham's experiments in Philadelphia did not support Dr. Latham's, of London, with regard to its influence on the nervous system. Phil. Journ. M. and Phys. Sc. vi, 22. Otto found solania in the germs of the potato. The water in which potatoes are boiled contain solanina. The stalks contain a large quantity of potash, "and it is said that if the stalks were appropriated to this manufacture that they would supply most that is required in commerce." They also afford a bright yellow dye by bruising and pressing when in flower. Griffith, Jour. Sc. and Arts, v. Eating the unripe fruit has caused death.

The Irish as well as the sweet potato, rice, etc., contain starch in large amount, and it is easily obtained. See "*Maranta,*" Arrow-root, in this volume.

The following is a method of cleaning silks with potatoes: three potatoes are pared into thin slices and well washed; pour on them a half pint of boiling water, and add to it an equal quantity of alcohol; sponge the silk on the right side, and when half dry iron it on the wrong side. The most delicate colored silks may be cleansed by this process, which is equally applicable to cloth, velvet, or crape. See "Ivy."

TOMATO, (*Solanum lycopersicum.* Ex.) Cult.

The fruit of this plant is well known as an article of food; it is slightly acid, and has a constipating effect, which renders it so appropriate as an article of food during the warm months of summer. The leaves are said to produce vomiting, from an alkaline principle which exists in them; they also contain calcareous sulphates, extractive, and a coloring matter, combined with a volatile oil. See analysis in Journal de Pharm. xviii, 106; Griffith's Med. Bot. 483. The alkaloid principle contained in the leaves is analagous to, if not identical with, *solanina.* A peculiar oil and an animalized extractive are also ascribed to it by other observers. Journal Phil. Coll. Pharm. iv, 224. The fruit contains a peculiar acid, and a brown, tarry, odorous, resinous matter, with some indications of the presence of an alkaloid. It is said to act on the biliary functions.

Tomatoes may be preserved for winter use in a portable form suitable for distribution to soldiers in camp as well as for fami-

lies, in the following manner: mash the fruit, strain the juice through a coarse towel, season with salt, boil in a pewter or tin vessel until one-third is evaporated; then spread on a flat surface and expose to the sun till it looks like a paste. When ready to store away put writing paper over the paste, wet in vinegar. The watery parts are all evaporated, and a small portion is enough to season soup, broths, etc. The economical value of the plant is well known. The seeds are irritant to the mucous coat of the digestive organs, but the laxative effect is corrected by the juice, which darkens the excreta as if a salt of iron had been taken. The use of the fruit tends to promote constipation and prevent diarrhœa. The juice will take out the stain of iron rust from linen and woollen by adding a little salt to it.

Physalis pubescens. Grows in sandy soils; collected in St. John's. Fl. July.

Mér. and de L. Dict. de M. Méd. v, 296; Journal de Chim. Méd. vi, 210. It is supposed that the species bearing this name in Europe and America are different. The former is interesting. Our native species of physalis have been prescribed as diuretics and sedatives. The fruit of all are edible. Griffith.

GROUND-CHERRY, (*Physalis viscosa*, L. *Physalis obscura*, Mich. *Physalis pubescens*, L.) Diffused; grows along roads; collected in St. John's Berkeley; vicinity of Charleston. Fl. August.

This is said by Clayton to be actively diuretic.

Nicandra physaloides, Gaert. *Atropa*, L. Grows around buildings; in rich soils. Fl. August.

This plant would probably be found upon examination to be possessed of some medicinal qualities, either narcotic or sedative.

TOBACCO, (*Nicotiana tabacum*, W.) Introduced. I have seen it naturalized in Fairfield District, S. C. This well known plant, the use of which every day increases throughout the civilized world, and which adds so much to the income of States, is extensively cultivated in Virginia and N. Carolina and to a lesser degree in the other Southern States. In the lower portions of Georgia it is planted as an article of trade. Its properties are well known. See medical authors.

Tobacco should be more extensively cultivated for home use,

particularly for the comfort of our working class in Carolina, Georgia and Alabama. I have seen it springing up, and bearing abundantly near Stateburg, also in St. John's Berkeley, South Carolina; it was flourishing without culture.

The seed of the Virginia or Kentucky plants when grown in S. C., produces a fine light colored leaf when dried, but upon smoking it is found to be strong and heady. Florida and Cuba seed are easily procured, and they produce a much milder variety. Cigars made of Florida tobacco are well known for their mildness.

The following statement accords with my experience, with the exception of the variety grown in France:

"Smokers who are susceptible to the effects of nicotine should be careful in their choice of tobacco, the different kinds of which have widely different amounts of nicotine. In that of Turkey, Greece and Hungary there is scarcely a trace of the poison. In that of Brazil, Havana and Paraguay the amount is two per cent. In that of Maryland 2.29; of Alsace 3.21; of Kentucky 6; of Virginia 6.87, and of France 7.30 per cent."

The use of coffee is said to be an antidote for that of tobacco, and its value in that way is sustained by my own experience. Consult Johnson's Chemistry of Common Life, vol. ii, p. 32, for an interesting account of tobacco; the papers in the Lancet during the controversy on the subject of the use of tobacco; also the British and Foreign Med. Chirurg. Review. As a local application to produce relaxation tobacco leaves are a valuable agent cautiously used, and discontinued when nausea or vomiting ensue. I have found a poultice made with it particularly serviceable in orchitis. In the manufacture of *Killickinick* tobacco in Virginia they add sumach leaves, which lessens the strength. See a paper on the "Cultivation of Cuba Tobacco," by J. M. Hernandez, of St. Augustine, Florida, in Patent Office Reports, 1854, p. 212; the best mode of preparing it is also treated of. The ashes of tobacco contain a large proportion of potash, and are given with gin as a diuretic in dropsy; burning may certainly temper the great activity of the plant. The residuum of ash after burning is very great, as any one can observe by noticing what remains when a cigar is consumed. The plant also yields ammoniacal salts. A full account of the amount of tobacco produced in the several States, and of the

culture and mode of preparation may be found in the Farmer's Encyc. from the Farm Register. In planting tobacco the seeds are raised upon earth where logs have been burned, the plants being afterward transplanted. It would be presumptuous in the writer to describe in detail the cultivation of our staple products, though many desire information concerning those with the culture of which they are unacquainted. This plant not being eaten by animals may be planted on a small scale in stable and other yards. I have seen it growing luxuriantly in these situations. Mr. Gilmore Simms informs me that a neighbor of his in Edgefield District made $150 from two acres in 1868.

I have thought it advisable in this, the 2d Edition, to republish one or two practical articles on the method of planting and rearing and preparing the tobacco plant, which received prizes from the "American Agriculturist," that those residing in sections of country where the plant is not generally cultivated may obtain the necessary information. I select two of the papers from a pamphlet entitled "Tobacco Culture; practical details from the selection and preparation of the seed and the soil to harvesting, curing and marketing the crop. Plain directions as given by fourteen experienced cultivators residing in different parts of the U. States. N. York, Orange Judd & Co." I regret that there are none written from localities in Virginia, though numerous essays have appeared in that State. Allowances must be made for difference of climate. The first is by Judson Popenoe, of Montgomery Co., Ohio:

I commenced the cultivation of tobacco about fifteen years ago; I therefore write from experience, and shall try to give that experience in a short and plain way.

Varieties.—I have cultivated various kinds of tobacco, but have come to the conclusion that what we call the Ohio seed-leaf is the best and most profitable kind for general cultivation. There are other kinds of tobacco that sometimes are profitable, and do well, but most of these do not cure out so well, nor color so evenly, nor are they so fine and saleable as the seed-leaf. The Havana tobacco is too small and has not the fine flavor of the imported. The Connecticut seed-leaf I believe to be identical with our Ohio seed-leaf; the difference in the climate may make a slight variation in the quality, but we plant the Con-

necticut seed-leaf here in Ohio, and I don't think they can be told apart. The most of the tobacco raised in this district is the seed-leaf, which is strong evidence that it is the best and most profitable kind to raise here.

Seed.—At topping-time a few of the most thrifty stalks should be left to grow without topping, for seed. When the crop is cut let the seed-stalks stand, stripping off the leaves and suckers. As soon as the seed-pods are black, the seed is matured; then cut off the seed-heads below the forks of the plant, and hang them in a dry place, out of the reach of mice, to cure. At leisure time, during the winter, strip the seed-pods from off the stalk, rub them in the hands until the seed is rubbed out, sift through a fine sifter, put in a dry place, secure from vermin of all kinds, and it is ready to sow. I have sowed seed six years old which grew as well as new seed. I think it is a good plan to raise seed enough at any time to sow for ten years, as it is thought to deteriorate by constant raising without changing. If seed snaps or pops when it is thrown on a hot stove, it will grow.

Preparing Seed-Beds.—There are two plans of preparing beds for sowing seed; the first, and best, is to spade or plow a bed in rich, dry ground, with a southern exposure; the south end of a barn is a good place, as the reflection helps to warm the ground. Where you have tobacco stalks, as you make a furrow with the plow or spade, fill one-third full with the stalks and turn the next furrow over them, and so continue until the bed is broken up. The stalks hold moisture, make the bed warm, and help to drain it. Take well rotted hog manure and spread over the bed, to the depth of about two inches, then harrow or rake until the manure is thoroughly mixed with the surface of the bed, and all is well pulverized, and as fine as garden mold. For a bed one rod wide and four rods long take two common sized table-spoonsful (as much as will lie on conveniently) of seed and mix it with four quarts of ashes, or slacked lime, and sow broadcast; the ashes will enable the seed to be sowed evenly; then take a hand roller and roll the bed evenly, or place a board on one end of the bed and walk on it to press the ground to the seed, move it over and repeat this until the bed is all pressed over. Another plan is to burn a large brush-heap in a clearing or on any new ground in the evening; in the morning dig the ground up with

the ashes on; while warm, rake the bed fine and sow the seed as above directed. Very little weeding is required where the ground is burned, as the fire destroys the weed and grass-seeds.

If the weather is dry the plants will need watering after they are sprouted, (which will be in about three weeks;) in fact, the surface of the bed should be kept constantly moist; the beds should be kept clear of weeds; do not let the weeds get a start of your plants or they will soon choke them out. If the plants grow well and evenly, the above-sized bed will plant four or five acres, but it is always safe to have two or three such beds, to guard against a failure, and to supply your neighbors. The usual time to sow is from the middle of March to the tenth of April, or as soon as the ground admits of working in the spring. I have known seed sown in the fall make good plants, but do not recommend it.

Soil.—A rich, sandy, second bottom, I believe to be the best for raising tobacco, although our chocolate-colored uplands, when very rich and highly manured, will grow an excellent quality of tobacco, but will not yield as much to the acre. Black river bottoms will yield more to the acre than any other kind of land, but the tobacco is not of so fine a quality; it grows larger, has coarser stems and heavier body, and consequently, in my opinion, is not so good for wrappers or fine cut as the second bottom or upland tobacco.

Manuring and Preparing for Planting.—Tobacco is a gross feeder and grows rapidly when once started, therefore needs plenty of food to make it grow well. There should be a good coat of clover to plow under; if the ground is naturally rich, this alone will make a good crop, but hog and stable manure, well rotted, is what the tobacco, as well as any other crop, delights in, and the more manure the better the tobacco. The plan that I am now experimenting on is, as soon as I cut my tobacco in the fall I give the ground a good harrowing, and then drill in wheat; the ground being well cultivated all the fall, is clear of weeds and mellow and needs no plowing. In the spring I sow clover, after the wheat is off; I keep the stock off until about September, to give the clover a chance to harden and spread. I then let the stock eat as low as they want to, which drives the clover to root and causes the crown to spread; I do not suffer stock to run on the clover during winter or

spring; about the last of May or first of June I plow the clover under, which is now in blossom, and so I alternately keep two fields in tobacco and wheat, at the same time feeding the ground a crop of clover every two years; in this way I expect my land to increase in fertility all the time. The clover turned under makes food for the cut-worms, and they trouble the tobacco plants but little. We now harrow thoroughly, following in the same way that we plow, to make the sod lie flat and not drag up; next the roller is put on, and after the ground is well rolled it should be again harrowed, and, if cloddy, rolled again. Make the ground in the best condition possible, so that the roots of the tobacco will have no difficulty in penetrating the soil and searching for food. My plan is to furrow east and west three feet apart, north and south three and a half feet. I plow the tobacco both ways, but do all the hoeing, suckering, etc., north and south. Some mark out the ground three feet each way, but I think it is too close. If the tobacco is large, three feet does not give room to work among it conveniently. I mark out the ground with a small one-horse plow, going east and west first, finishing the way that I make my hills. The usual way to make the hills is with the hoe, making the hill where the furrows cross each other, drawing the dirt into a hill about as large as for covering corn or potatoes. With the flat part or back of the hoe press or flatten the hill down to the level of the surface of the ground, taking care to have it clear of clods or rubbish. I generally make my hills with what we call a jumping-shovel—the frame of a single shovel-plow, made light, with a shovel about eight inches square, put on in the place of the common shovel. Hitch a steady horse to this, start him in the furrows, dip the shovel in the middle of the furrows, and raise it, depositing the dirt at the cross of the furrows. Have a hand following to level and pat down the hills, and take out clods. In this way I made, with the assistance of a boy fifteen years old, about fifteen thousand hills in a day, while with the hoe alone three or four thousand is a good day's work.

Setting out Plants.—From the first to the fifteenth of June is the proper time, although, if it is seasonable, up to the fourth of July will do, but the sooner after the first of June the better. By this time, with proper care and attention, the plants are large enough. The ground should be well saturated with rain,

and a cloudy day is much the best. Immediately after a rain, or between showers, call out all the force, for the work is pressing; the success of the crop depends on getting it out at the right time; all hands go to the plant beds, pull the largest plants one at a time; don't let two stick together, or the boys will drop them together and the plant will be lost. After the baskets are full, let one hand continue to pull plants. Put the little boys and girls to dropping one plant on the side of each hill; let those who stick take an extra plant in the hand, drawing the leaves together in the left hand, and with the forefinger of the right hand make a hole in the centre of the hill deep enough to receive the full length of the roots without the top root bending up; insert the plant up to the collar with the left hand, stick the forefinger of the right hand one or two inches from the plant, and press the dirt well up against the roots, taking care that the dirt is pressed so as to fill up the hole. Pick up the plant on the side of the hill, and as you step to the next hill, arrange it for sticking; in this way you always stick the plant that you pick from one hill in the next, thereby greatly facilitating the work. Sometimes the ground is not sufficiently wet, and the sun, coming on the plant, is apt to injure it; at such times take a small clod and lay it on the heart of the plant to keep the sun off, removing the clod in the evening. As soon as the plants have started, the first time the ground is wet enough replant where they have died out.

Cultivation.—As soon as the plants have taken root and commenced to grow, begin to use a double shovel-plow, having the shovel next the tobacco, about three inches wide and six or eight inches long; do not go too close to the hill, or you may displace the plant; follow with a hoe, removing all grass and weeds, leaving the tobacco master of the situation. Dig gently the surface of the hill, and draw a little fine dirt around the plant, and strive to keep the soil around the hill as mellow as possible without disturbing the plant. After going over in this manner, plow the opposite way, going twice in a row. Some prefer the cultivator for going over the first two times, and, I think, perhaps it would be preferable, as it pulverizes the ground better than the shovel-plow. After going over the field twice, in the above manner, commence again with the double shovel-plow, the way the tobacco was planted, following with the hoe,

giving it a good hoeing as before. Use your judgment about the amount of tillage needed; keep clear of weeds; keep the ground mellow, and when the plants have spread so that they are bruised by the hoe and plow, stop cultivating.

Worms.—As soon as worms appear, which is generally when the leaves are as big as a man's hand, go over the tobacco, looking carefully at every plant. The worms usually stay on the underside of the leaf; if you see a hole in the leaf, no matter how small, raise it up and you will generally find a worm under it. Worming cannot be done too carefully. Miss one or two worms on a plant, and before you are aware of it the plant is nearly eaten up. When you find a worm, take hold of it with the thumb and forefinger, giving your thumb that peculiar twist which none but those who are practiced in it know how to do, and put the proper amount of pressure on, and my word for it you will render his wormship harmless. Worming has to be continued until the tobacco is cut; the last worming to be immediately preceding cutting and housing.

Topping.—The tobacco is ready to top when the button (as the blossom or top of the stalk is called) has put out sufficiently to be taken hold of, without injury to the top leaves. As tobacco is not regular in coming into blossom, it is the usual practice to let those stalks that blossom first, run a little beyond their time of topping, and then top all that is in button as you go. There is no particular height to top at, but as a general thing sixteen to eighteen leaves are left; judgment is necessary to determine where to top; if topped too high, two or three of the top leaves are so small as not to amount to much; if topped low, the tobacco spreads better; if just coming out in top, reach down among the top leaves, and with thumb and forefinger pinch the top or button off below two or three leaves; if well out in top, break off several inches down from the button and four or five leaves below it.

Suckering.—As soon as the tobacco is topped the suckers begin to grow; one shoots out from the stalk at the root of each leaf, on the upper side. When the top suckers are from three to four inches long, the suckering should be done; with the right hand take hold of the top sucker, with the left take hold of the next, close to the stalk, and break them off, and so proceed, using both hands, stooping over the stalk, taking care not to

injure the leaf. Break the suckers about half-way down the stalk, the balance being too short to need removing until the second suckering. In about two weeks from topping, the tobacco is ready to cut; now give it the last worming and suckering, breaking all suckers off down to the ground, and remove every worm, if you don't want your tobacco eaten in the sheds.

Cutting and Housing.—As a general rule tobacco should be cut in about two weeks from topping, at which time the leaves assume a spotted appearance and appear to have fulled up thicker; double up the leaf and press it together with thumb and finger, and, if ready to cut, the leaf where pressed will break crisp and short. Do not let your tobacco get over-ripe or it will cure up yellow and spotted; it is better to cut too soon than too late. Take a hatchet or short corn knife, grasp the stalk with the left hand, bend it well to the left, so as to expose the lower part of the stalk, strike with the knife just at the surface of the ground, let the stalk drop over on the ground without doubling the leaves under, and leave it to wilt. The usual practice is to worm and sucker while the dew is on in the morning, and as soon as the dew is off to commence cutting. There are some who advocate cutting in the afternoon, say three o'clock; let it wilt and lie out until the dew is off next day, and take it in before the sun gets hot enough to burn it. I prefer the first plan, because a heavy dew may fall on the tobacco, and next day be cloudy, leaving the tobacco wet and unpleasant to handle. After cutting allow the tobacco to wilt long enough to make the leaves tough, so that they can be handled without tearing. Great care is now necessary to keep the tobacco from sun-burning; cutting should be commenced as soon as the dew is off, and all that is cut should be housed by eleven o'clock, unless it is cloudy; from eleven to two o'clock the direct rays of the sun on the tobacco, after it is cut, will burn the leaves in twenty minutes; after two, as a general thing, there is no danger of such burning, the sun's rays not striking direct on the tobacco. Have a wagon at hand, with stiff boards, twelve feet long, laid on the running gears; as soon as the tobacco is wilted so that it can be handled without breaking, commence loading on both sides of the wagon on the front end, lapping the tobacco the same as loading fodder, keeping the butts out on both sides—build about two feet high, and so on until loaded.

Tobacco Barn.—Mine is fifty by thirty-three feet, with eighteen feet posts; the tiers are four and a half feet apart. I hang four full tiers of tobacco, and hang between the purline plates in the comb, a half tier; the bents of the frame are sixteen and two-eighths feet apart. I hang on four feet sticks made of hickory, rived one-half inch by one and a quarter inches, shaved and tapered at one end to receive an iron socket; I have sawed sugar-tree scantlings sixteen and two-eighths feet long, three by four inches thick, for the ends of the sticks to rest on and meet in the centre of the rail, one and a half inches resting on it. Some use sawed lath to hang on, but the split and shaved are far preferable. Hanging on fence-rails with twine is going out of use, as it should. I use my barn to store wheat and barley, doing the threshing just before tobacco-hanging. My barn will hang about seven acres of good tobacco.

Housing Tobacco.—The tobacco being brought to the barn, should be unloaded on a platform or bench convenient for handling. An iron socket, about six inches long, three-quarters by one and a quarter inches at the big end, tapering to a sharp point is necessary; the sticks should be shaved so as to fit the socket as near as possible, but do not bring the stick to a sharp point, or it will not lie firmly on the rail. Have a one and a half inch hole bored three inches deep in the barn-post, three feet from the ground or floor; let the hole be bored slanting down a little, so that the socket end of the lath may be the highest; put the end of the stick that is not tapered into this hole and the socket on the lath; take hold of a stalk with the right hand, about one foot from the butt end, bring it against the point of the socket, six inches from the butt of the stalk, grasp the butt with the left hand, and give the right hand a firm, quick jerk to start the stalk to split; then, with both hands, pull it back against the post, and so on until you have the stick full. The stalks should not be crowded on the sticks, four or five inches apart is close enough; eight or nine large stalks are enough for a four-foot stick. Having filled the stick, remove the socket, lay your stick of tobacco on the floor, and go on sticking until the load is all stuck; or it is a good plan to have rails laid on the lower tie and hang for the present as you stick. While one or two hands are hanging one load, another may be in the field bringing in another. In hanging, have a single block and half-

inch rope, with a hook at one end; secure the block near where you hang, place the hook in the centre of the stick of tobacco, and let the man on the floor draw it up to the one who hangs. There should be a stout pine board, two inches thick, fifteen inches wide, and long enough to reach from tie to tie; this should be placed under where you hang, to walk on. When the tobacco is hoisted up, take it off the hook, and walk to the farther end of the board; have your rails placed to receive the stick, and so continue until your rails are full, then move your board and block to another place, and so continue. A sixteen-foot rail will hang about twenty-four laths; eight inches apart is about the distance to place the laths of tobacco on the rails; if too much crowded the tobacco will house-burn. Care should be used never to let a load of tobacco lie long on the wagon or in a pile, as it sweats and heats and is soon ruined. Always keep the tobacco cool. After it is housed, keep the doors open day and night, so that it may have the benefit of the warm and dry air for the purpose of curing, closing the doors against high winds and beating rains. When cured keep the doors closed.

Stripping.—When the tobacco is sufficiently cured to strip, which will be after it has been well frozen and dried out, you will have to watch for it to get "in case" for handling; when a warm, wet, misty spell of weather comes, throw open the doors to allow the tobacco to take the damp. When the stems of the leaves are so limber that they will not snap, and the leaves are pliable, but not too wet, take down a sufficient quantity to strip for two or three days; take it off the sticks, make a temporary crib of boards about four feet wide, and bulk the tobacco in it, laying the tops in, butts out, next the boards. After you have made your bulk, cover with an old carpet, boards, or anything else handy, to keep it from getting too damp or from drying out. Care should be taken that the bulk does not heat; if the stalks are wet or there is any uncured tobacco, forty eight hours is sufficient to spoil the tobacco. During the winter there are generally several tobacco seasons, and by improving them the stripping can all be done before March. Having the bulk down we now proceed to strip for market; lay a pile of the tobacco on a bench or platform about two feet high, and let the most careful and handy man take a stalk in his left hand, give it a shake to make the leaves hang out free, then pick off four or

five of the bottom or ground leaves, and any badly torn or diseased leaves, and all such as are not considered *prime;* do not put any frosted or "*fat*" leaves in, as it spoils the tobacco; pass the stalk that is primed to the stripper, and let him take off the prime leaves. Take off one leaf at a time, keeping them straight in the hand; when a sufficient number are taken off to make what is called a hand of tobacco, take a leaf in the right hand, put the thumb of the left hand on the end of the leaf about one inch from the butt of the hand or bunch, and pass the leaf around once or twice; an inch is wide enough for the hand; open the hand of tobacco in the centre, pass the end of the leaf through and draw it tight, then squeeze the hand together and lay it down, keeping the leaves straight. An inch and a half in diameter is large enough for a hand. When a sufficient quantity is stripped to commence bulking, make two places to bulk in, one for prime and one for ground leaf; let the space be according to the quantity of tobacco to bulk. A bulk three and a half feet high and twenty feet long will hold ten boxes or about four thousand pounds of prime tobacco; the sides of the bulk must not be inclosed, but left open, so that the butts can dry out; at each end of the bulk put a bulkhead of boards to build against, about three feet wide and four feet high; secure this upright and firm; do not build on the ground, but on a platform or floor. Commence at one end against the bulkhead, take one hand of tobacco at a time, straighten and smooth it, and lay it on the floor at one side of the bulk; take another as above, press it against the first, and so proceed to lay the length of the bulk; then turn and lay down the other side of the bulk, letting the ends of the tobacco lap over the first row about four inches, and so repeat, keeping the butts even. After one or two rounds are laid, get on the bulk on the knees, and as you lay a hand put your knee on it, and thus pack as close and compact as possible. When not bulking down have boards laid on the tobacco and weights put on to keep the tobacco level. Keep the ground leaf separate from the prime.

Boxing.—Boxes should be made 30 inches square by 42 inches in length outside; saw the end-boards 28 inches long, nail them to two 1¼ inch square slats so that the head will be 28 inches square; when two heads are made, nail the sides of the box to the heads so as to come even with the outside of the head, the

sides being 28 inches wide; then nail the bottom on firmly; the top can be nailed slightly until after the tobacco is packed, when it can be nailed firm. Set your box by the side of the bulk, and let one hand get in the box and another pass the tobacco to him, one hand at a time, taking care not to shake it out, but put in the box as it comes from bulk, with the butt of the hand next the end of the box. Place close and press with the knee firmly; lay alternate courses at each end, and if the tobacco is not long enough to lap sufficiently to fill the centre, put a few hands crosswise in the centre. When the box is full, place it under a lever; have a follower, which is a cover made of inch boards, nailed to two pieces of scantling and made to fit inside of the box; lay this on the tobacco, and build with blocks of scantling on it of a sufficient height for the lever to be clear of the box when pressed. Press down firmly with a strong lever, and, while kneeling in another box full, let the lever remain, so that the tobacco gets set in the box. When ready take the lever off and fill up as before, about six inches higher than the box; press it below the top of the box, take off your lever and nail on the top as quickly as possible. Some use tobacco-presses for packing, which are perhaps more convenient; they are of various patterns, but a lever saves the expense of a press, and is in the reach of all. If tobacco is sold at the shed, it should be sold before packing, being easier examined in bulk than box.

No. two is by W. W. W. Bowie, Prince George's County, Md.

Seed-Beds.—A rich loam is the soil for tobacco plants. The spot for a bed should be the south side of a gentle elevation, as well protected as possible by woods or shrubbery. After a thorough burning of brush, dig deep, and continue to dig, rake and chop, until every clod, root and stone be removed; then level and pulverize nicely with a rake. As to the variety to plant, I think the Cuba is a very good kind for our climate. The Connecticut seed-leaf is the best, but culture has more than anything else to do with the quality. Mix one gill of seed for every ten square yards with a quart of plaster or sifted ashes, and sow it regularly in the same manner that gardeners sow small seeds, only with a heavier hand; roll with a hand-roller or tramp it with the feet. If the bed is sown early, it ought to be covered with brush free from leaves; but it is not necessary

to cover it after the middle of March. Tobacco-beds may be sown at any time during the winter if the ground be not too wet or frozen. The best time for sowing is from the 10th to the 20th of March, though it is safest to sow at intervals, whenever the land is in fine order for working. Never sow unless the land is in good order, for the work will be thrown away if the land be too moist or be not perfectly prepared. The beds must be kept free from grass or weeds, which must be picked out one at a time by the fingers. It is a tedious and troublesome operation, therefore you should be very careful not to use any manures on your beds which have grass or weed-seeds in them. After the plants are up they should receive a slight top-dressing of manure once a week, sown broadcast by the hand. This manure should be composed of half a bushel of unleached ashes, (or one bushel of burnt turf,) one bushel of fresh virgin woods-earth, one gallon of plaster, half a gallon of soot, one quart of salt dissolved in two gallons of liquid from barnyard, and four pounds of pulverized sulphur, the whole well intermixed. Let a large quantity be put together early in the spring, or winter rather, and put away in barrels for use when wanted. This, and other such mixtures, have been found efficacious in arresting the ravages of the fly—both from the frequent dusting of the plants and the increased vigor which it imparts to them, thereby enabling the plant the sooner to get out of the tender state in which the fly is most destructive to it. The fly is a small black insect, somewhat like the flea, and delights in cold, dry, harsh weather, but disappears with the mild showers and hot suns of opening summer. If possible, the plants should stand in the bed from half an inch to one-inch apart, and if they are too thick they must be raked when they have generally become as large as five or ten-cent pieces. The rake proper for the purpose should be a small common rake, with iron teeth three inches long, curved at the points, teeth flat, and three-eighths of an inch wide, and set half an inch apart.

After-Culture.—The soil best adapted to the growth of tobacco is light, friable soil, or what is commonly called a sandy loam, not too flat, but rolling, undulating land—not liable to drown in excessive rains. New land is far better than old. Ashes are decidedly superior to any other fertilizer for tobacco. Theory and practice unite in sustaining this assertion. The land in-

tended for tobacco should be well plowed in April, taking care to turn the turf completely under, and sub-soiling any portions that may be very stiff and hold to water near the surface; and let the land be well harrowed directly after breaking it up. It should then be kept clean, light, and well pulverized by occasional working with cultivators and large harrows, so as not to disturb the turf beneath the surface. When the plants are of good size for transplanting, and the ground in good order for their reception, the land, or so much as can be planted in a "season," should be "scraped," which is done by running parallel furrows, with a small seeding-plow, two and a half feet apart, and then crossing these again at right angles, preserving the same distance, which leaves the ground divided in checks or squares of two and a half or three feet each way. The hoes are then put to work and the hill is formed by drawing the two front angles of the square into the hollow or middle, and then smoothed on top and patted by one blow of the hoe. The furrows should be run shallow, for the hills should be low and well levelled off on the top, and, if possible, a slight depression near the centre, so as to collect the water near the plant. The first fine rain thereafter the plants should be removed from the seed-beds, and one carefully planted in each hill. A brisk man can plant from five to six thousand plants per day. The smaller or weaker hands, with baskets filled with plants, precede the *planters*, and drop the plants on the hill. In drawing the plants from the bed, and carrying them to the ground, great care should be taken not to bruise or mash them. They ought to be put in baskets or barrels, if removed in carts, so that not many will be in a heap together. The plants should never be planted deeper than when they stood in the bed. Planting is done thus: Seize the plants dropped on the hill with the left hand; with one finger of the right hand make a hole in the centre of the hill, and with the left put in the root of the plant. The dirt is well closed about the roots of the plants, (put in with the left,) by pressing the forefinger and thumb of the right hand on each side of the plant, taking care to close the earth well about the bottom of the root. If sticks are used to plant with, they should be short, and the planter should be careful not to make the hole too deep. The plants should be very carefully planted, for if the roots are put in crooked and bent up, the

plant may live but never flourish, and, perhaps, when too late to replant, it will die, and then all the labor will be wasted. In three or four days it may be weeded out—that is, the hoes are passed near the plants, and the hard crust formed on the hills pulled away, and the edges of the hill pulled down in the furrows; this is easily done if performed soon after planting, but if delayed, and the ground gets grassy, it will then be found a very troublesome operation. After weeding out, put a gill of equal parts of plaster and ashes, well mixed, upon each plant. In a few days, say a week or less time, run a small plow through it, going twice in a row. This is a delicate operation, and requires a steady horse and skilful plowman, for without great care the plants will be knocked up or be killed by the working. In a week after, the tobacco cultivator or plow must be used. Either implement is valuable at this stage of the crop. But once in a row is often enough for either cultivator or shovel-plow to pass. The crop can now be made with their use by working the tobacco once a week for four or five weeks, going each time across the former working. Any grass growing near the root of the plants should be pulled out by hand. As soon as the tobacco has become too large to work without injuring the leaves by the single-trees, the hoes should pass through it, drawing a little earth to the plants when required, and levelling the furrows made by the cultivator and shovel. Let this hoeing be well done, and the crop wants no more working. Care should be taken to leave the land as level as possible, for level culture is best.

Topping.—When it blossoms the best plants ought to be selected; one hundred plants being enough to save for seed to sow a crop of forty thousand pounds. All the rest should be topped before blossoming—indeed, as soon as the blossom bud is fairly formed. It should be topped down to the leaves that are six inches long, if early in the season, but if late, top still lower. If the season is favorable, in two weeks after a plant has been topped it will be fit for cutting, yet it will not suffer by standing longer in the field. From this stage of the crop until it is in the house, it is a source of solicitude and vexation to the planter. He is fearful of storms, of frost, and worms, his worst enemy—they come in crowds, "their name is legion"—and the suckers are to be pulled off when they get three or four

inches long; they spring out abundantly from the bottom of the plant or leaf where it joins the stalk. Ground leaves are those at the bottom of the plant which become dry on the stalk; gather them early in the morning, when they will not crumble.

Worms.—These ought to be pulled off and killed as fast as they appear, or they will destroy the crop. Turkeys are of great assistance in destroying these insects; they eat them and kill thousands which they do not eat, for it seems to be a cherished amusement to them to kill worms on tobacco; they grow passionately fond of it—they kill for the love of killing. There are every year two "gluts," as they are called by planters; the first attacking the plants about the time that they are about one-third or half grown, the other comes on when the tobacco is ready for cutting. The first can be easily subdued by a good supply of turkeys, and if *then* they are effectually destroyed, the second glut will be very easy to manage; for it is the opinion of many intelligent and experienced planters that the greater portion of the first glut reappears the same year, as horn-blowers and breed myriads. When the second army of worms makes it appearance, the tobacco is so large that the turkeys do but little good. The only method, then, to destroy them, is to begin in time. Start when they are being hatched, and keep up a strict watch upon them, going over the whole field, plant by plant, and breaking the eggs, killing such as may be seen; and by constant attention during each morning and evening to this business alone, with the whole force of the farm, they may be prevented from doing much harm. When they disappear the second time there is no more cause of trouble.

Cutting and Housing.—When the plant begins to yellow, it is time to put it away. It is cut off close to the ground by turning up the bottom leaves and striking with a tobacco-knife, formed of an old scythe—such knives as are often used for cutting corn. Let it lie on the ground for a short time to wilt, and then carry it to the tobacco-house, when it may be put away in three different modes, by "pegging," "spearing," and "splitting." Pegging tobacco is the neatest way and best, yet the slowest. It is done by driving pegs about six inches long and half an inch or less square into the stalk, about four inches

from the big end of the stalk; and these pegs are driven in with a mallet, in a slanting direction, so as to hook on to the sticks in the house. It is then put on to a "horse," which, by a rope fixed to one corner, is pulled up in the house and there hung upon the sticks, which are regulated at proper distances. A "tobacco-horse" is nothing more than three small sticks nailed together so as to form a triangle, each side being three or four feet long. Spearing is the plan I pursue; because it is neat enough and decidedly the quickest plan. A rough block, with a hole morticed in it, and a little fork a few inches from the hole for the tobacco-stick to rest upon, one end being in the hole and a spear on the other end of the stick, is all the apparatus required; the plant is then, with both hands, run over the spear and thus strung upon the sticks, which, when full, are taken to the house and hung up at once. There are "dart-spears," like the Indian dart, and "round spears." Either will do.

"Splitting" tobacco is admired by many who contend that it cures brighter, quicker, and is less likely to *house-burn* or injure from too thick hanging. This mode is pursued easily by simply splitting, with a knife made for the purpose, the plant from the top to within a few inches of the bottom, before it is cut down for housing. Care should be taken not to break the leaves while splitting the stalk. The knife for splitting may be fully described by saying it is a miniature spade. It can be easily made out of an old scythe-blade inserted in a cleft white oak handle, with its edges bevelled off to the blade, so that it acts like a wedge to the descending knife. After the tobacco is split, cut down and carried to the house, it is straddled across the sticks and hung up. The sticks are generally supported by forks driven into the ground near the heap of tobacco, for greater convenience to the person putting on the plants. Tobacco sticks are small round sticks, or are split out like laths, and are about one-inch square at one end, or one and a half inches square, usually larger at one end than the other, and they should be about eight or ten inches longer than the distance between joists of the tobacco-house. As the tobacco cures they may be pushed up closer. After the house is filled, some put large fires under it, as soon as it has turned yellow, and by hot fires it dries at once and does not change color, unless to increase

the brightness; but "firing" gives it a smoky smell and taste that is not much liked by buyers. The cost of labor and loss of wood, and the risk of losing tobacco and house too, are great objections well urged against firing. The better plan is to have sufficient house-room, and hang it thin in houses not too large, which have windows and doors so as to admit light and air, and by closing them in bad weather, exclude the rain and dampness, which materially damage the tobacco, besides injuring the color of it.

Stripping.—After becoming dry and well cured, the stems of the leaves being free from sap, the first mild damp spell of weather it will become pliant and may then be stripped off the stalk. It is first pulled or taken off the sticks and put in piles, then the leaves are stripped off, tied and put in bundles of about one-fifth or sixth of a pound in each. The bundles are formed by wrapping a leaf around the upper part of the handful of leaves for about four inches, and tucking the end in the middle of the handle to confine it. There ought, if the crop will permit, to be four kinds of tobacco, "*yellow*," "*bright*," "*dull*," and "*second*." When the tobacco is taken down, the "cullers" take each plant and pull off the defective leaves that are next to the big end of the stalk, and then throw the *plant* to the next person, who strips off all of the *bright* leaves, (and if there are any yellow leaves, he lays them on one side until he has got enough to make a bundle,) and throws the plant to the next person, who takes off all the rest, being the "*dull*;" and the respective strippers, as they get enough leaves in hand to make a bundle, throw one side for convenience sake to bulk. Stripping never should be done in dry or harsh weather, unless the tobacco is bulked up almost as fast as stripped. The best plan is not to take down more than you can conveniently tie up in a few hours; but if the planter chooses, he may take down a large quantity and put it in large bulk, stalk and all, and cover it with tobacco-stalks, and it will keep for many days, so that no matter how the weather be, he can strip out of the bulk. However, this is a very bad and wasteful way. Tobacco should not be too moist or "*high*," as it is termed, when put in stalk bulk, or it will get warm, the leaves stick to the stalk, get a bad smell and change color; besides, if left too long, it will rot.

Bulking and Conditioning.—To bulk tobacco requires judgment and neatness. Two logs should be laid parallel to each other, about thirty inches apart, and the space between them filled with sticks for the purpose of keeping the tobacco from the dampness of the ground. The bundles are then taken one at a time, spread out and smoothed down, which is most conveniently done by putting it against the breast and stroking the leaves downward smooth and straight with the right hand. It is then passed, two bundles at a time, to the man bulking. He takes them and lays them down and presses them with his hands; they are laid, two at a time, in a straight line—the broad part of the bundles slightly projecting over the next two—and two rows of bundles are put in a bulk, both rows carried on together, the heads being on the outside, and the tails just lapping one over the other in regular succession. The bulk, when carried up to a convenient height, should have a few sticks laid across to keep it in place. It must often be examined, and if getting warm it ought to be immediately changed and laid down in another bulk of less height, and not pressed as it is laid down; this is called "wind-rowing;" being loose and open, it admits the air between the rows of bundles, hence the term. The next process in this troublesome, but beautiful crop, is to "condition" it for "*packing.*" The *bright*, *yellow*, and *second* tobacco will condition, but most generally in such bulbs as I have just described, but it is best to hang up the *dull* as soon almost as stripped. If the bright or second do not dry thoroughly in the bulks, that should also be hung up in the house to become well dried. To properly hang up tobacco to condition, small-sized sticks should be procured, and each one nicely smoothed with the drawing-knife, and kept for that purpose. After it has once been perfectly dry, either hanging up or in bulks—so dry that the heads are easily knocked off, and the shoulders of the bundles crack upon pressure like pipe-stems—it should be taken down, or if in bulks, removed, the first soft, moist spell of weather, as soon as it is soft and yielding enough, as it will become too dry to handle without crumbling or breaking, and it must be put in four or six-row bulks of any convenient length and height, the higher the better, laid down close, so that as little of the leaves or shoulders as possible be exposed on the outside of the bulk. When completed put sticks and logs of

wood, etc., on the top so as to weigh it down. Here it will keep sweet and in nice order for packing at any time, no matter what the weather be; if it was conditioned properly, it will not change a particle while in the condition-bulk.

Packing.—Mild, soft, pleasant weather is the best to pack tobacco in the hogshead. The size of the hogsheads is fixed by law, forty inches in the head and fifty-two in the length. Almost any wood will answer to saw into hogshead stuff; the best, of course, is that which is strong but weighs light, such as gum, or beech, or birch, or poplar. No hogshead ought to weigh over one hundred pounds, and staves drawn out of red oak, or other, which make the best, but are too costly, ought not to weigh over ninety pounds.

Having got our tobacco in good order, our hogshead ready, etc., the first mild day that we can spare, we proceed to packing. Let me observe that while putting the tobacco in condition-bulks, all of the bundles that were soft or had an ill smell ought to have been laid one side to be made sweet and dry by a few hours in the sun. The same precaution must be observed while packing. In putting tobacco into the hogshead for packing, a man gets in with *shoes off*, and lays one bundle at a time in a circle, beginning in the middle, and each circle is extended until the outer circle reaches the staves of the hogshead; a single row of bundles is then laid all round the edge of the heads of the last circle, then across the hogsheads in parallels with the former, always keeping the middle the highest; this is called a course. These courses are continued until the hogshead is filled. The man who packs, presses with his knees each bundle in each course, and often stands upon his feet and tramps heavily, but cautiously, all around and across, so as to get in as much as possible.

This concludes the almost ceaseless round of labor that is necessary to prepare for market this important staple of our country.

The following is by Christian Schneider, Madison County, Ill. (Translated by Ferdinand Schlueter.)

Introduction.—As in other kinds of farming, the culture of tobacco varies in different localities, and every cultivator must modify the hints here given to suit his own particular soil and location. The principal thing is, to understand the nature of

the plant, that is, the necessary requirements of soil, climate and culture, and the reason *why* all the work connected with its culture is done; for this must be adapted to the end aimed at; and not only *may* be different under other circumstances, but often *must* be so. I have, therefore, tried to explain why the work is done, and *how*, in my location, (Central Illinois,) I have most succeeded in growing the crop.

1. *Raising Plants from Seed.*—Raising tobacco plants from seed is somewhat similar to raising cabbage-plants, but is different in two important things: It takes considerably more time for the seed to sprout, (six weeks,) and, on account of disturbing the roots, cannot well stand weeding. Therefore the principal care in providing the seed-bed is, to prepare for the early starting of the seed, and to have the bed free from all weed-seeds. In the West we prepare the seed-bed in the following manner: we take a plot of land—newly cleared land is preferred—sloping southward and protected against winds. The bed should be four feet broad and eight long; on this we pile brush, wood and heavy logs, sufficient to keep up a strong fire for at least one hour and burn it. When the coals begin to die out, or before the soil is cold, the bed is cleared off, and only the fine ashes are left, then it is hoed thoroughly and as deep as the strongest heat has penetrated, after which it is raked cross and lengthwise, until the soil is entirely pulverized. Every thing that might hinder the growing of the plants, and their taking out afterwards, is carefully removed. On this bed a thimbleful of seed, well mixed with a few handsful of ashes or earth, is sown broadcast, and tramped in with the feet, or slapped with the underside of the spade or any other suitable instrument. After this, the bed is thoroughly wetted with a weak manure-water, twelve pounds of hen-droppings, or one pound of soot in ten gallons of water and lightly covered with straw. The seed-bed does not need much attention at first, if the weather remains mild; but if there is danger of night-frosts, a layer of brush must be made, and on this a layer of straw two to four inches thick, according to the degree of frost. The straw is removed in the morning and put on again at evening, leaving it off entirely when the nights are mild. Although the seed-bed is ready now, it must not be left to itself, and requires some care. The plants must always have sufficient

moisture, and if timely rains do not fall, they must be watered with weak liquid manure as often as needed. Should weeds appear, notwithstanding all precautions, they must be removed with the utmost care. The above mentioned quantity of seed is sufficient to raise plants for one acre.

Whoever is in possession of a hot-bed can raise the plants much easier; he can sow later and have plants earlier and with more certainty. But even the common bed may be made into a kind of hot-bed. The burned and hoed surface-soil is removed and put on one side, then one foot of fresh horse-dung is laid on the sub-soil, and the surface soil put back again. Boards may be placed around, cross pieces laid over them, and the straw covering put on these.

The earlier the young plants are ready for transplanting the surer the tobacco crop will be. March is the latest to make the seed-bed in the open air, and June the latest for transplanting. Some time may be gained by keeping the seed in damp earth in the room, and sow it in the seed-bed just before it commences to sprout.

For seed I recommend the following varieties: 1. Connecticut seed-leaf, principally for cigar wrappers; 2. Cuba, for fillers and wrappers; 3. Maryland; 4. Virginia, the last two principally for smoking and chewing tobacco. For snuff everything may be used, the refuse and even the stems. The Connecticut, Maryland and Virginia yield the largest crops, the Cuba the smallest but best. The first varieties yield about one thousand pounds, the latter five hundred pounds. In very favorable seasons double the amount may be raised. All tobacco seed, which is removed from its native clime and soil, will deteriorate, and the seed must be renewed from its native place, although the seed may, when it finds favorable soil, etc., yield just as good, if not a better variety.

To raise seed, leave the best and strongest plants for this purpose. The suckers only are removed, and the leaves left on the plant, until the seed is ripe.

2. *The Soil and its Preparation.*—In a suitable climate tobacco may be raised in every good cultivated soil. But what is "suitable climate?" Which are the northern and southern boundaries of its culture? We consider only the practical side of the question, and answer, tobacco can be raised as far north as

corn, and as far south as the sugar-cane. Wherever corn matures fully, tobacco will also mature, if properly cultivated. For us in the West, and for all the localities that have not an over-amount of heat, experience has proved, that a *dry, warm soil, (loam or sandy loam,) rich, deep and containing lime*, is most suitable for tobacco. The more sandy, to a certain degree, the soil is, the better will be the quality of the tobacco; the nearer the soil is to clay, the poorer will be the crop under similar circumstances, although the yield may yet be satisfactory. Clayey soil will hardly produce tobacco suitable for cigars. Wet and tough clay soils are under no circumstances suitable to tobacco.

Tobacco lands require also: 1st. Protection against winds. Where this is not done by nature, it may be artificially done by planting several rows of pole-beans a few steps apart. 2d. There must be no standing water. This is best prevented by deep plowing, by which the water will sink into the soil, where it belongs.

The land must be plowed deep, eight to twelve inches, and harrowed thoroughly until it is as fine as good garden soil. This is best done by plowing in the fall, exposing the hard and rough furrows to the frost; after the soil is dry in spring, it should be harrowed thoroughly, and then plowed and harrowed again for a second, and if necessary, for a third time, and rolled before planting. The different plowings, etc., should of course be done at intervals long enough to allow the land to settle. This is the treatment of soil that has been cultivated with the plow before tobacco is grown on it. It is somewhat different with newly turned (virgin) soil, or a clover-field, or a meadow, which the tobacco particularly likes. Deep and thorough working is the rule here also, but it is done in somewhat different way. In the virgin soil, all the roots must be picked up, because they would make the soil too loose for the secure insertion of the plant, and then they would hinder the cultivation with the hoe and the plow to a great degree. Meadows and clover-fields are broken up about three weeks before planting, eight to ten inches deep, taking care that the furrow is entirely turned, so that the grass is brought to the bottom. After eight to fourteen days, when the soil has settled, it is thoroughly harrowed in the direction of the furrows, to prevent the sod being turned up again, which must remain below undisturbed. Shortly before planting the

soil is harrowed again, and if necessary it is rolled and harrowed once more. This time it may be done crosswise. This treatment of meadows and clover-fields has these advantages: the newly turned sod prevents the weeds from coming up, and the underturned grass acts as a manure, and if the seed-bed should fail, (which may be the case,) the work of breaking up the soil is not lost, as other crops may be raised.

"*Tobacco makes the land poor.*"—This is experienced wherever tobacco is grown, and not only individuals, but whole countries have ruined their soil with this crop so thoroughly, that it remained barren for a long time after. Whoever, therefore, cultivates this hungry plant for more than a mere plaything, must be careful that he does not exhaust his land. He must not only possess a naturally rich soil, but must have plenty of manure at his disposition, and must follow a system of rotation. The writer of this is of the opinion, that the tobacco itself does not require much manure, if planted for the first time on otherwise good and rich soil, and that even animal manure will injure the tobacco for making cigars, and for smoking; but he does believe, that for the crop following the tobacco, manuring cannot be done too early, and too heavily. The manures are very different, and equally useful for the different kinds of tobacco. We may classify them as follows:

To be applied shortly before planting, and in equal quantities, for all kinds of tobacco: 1. Guano, 200 to 300 pounds on the acre; 2. Poultry-droppings, 400 to 500 pounds; 3. Green manure in any quantity; 4. Sheep-dung, 6 two-horse loads; 5. Cattle manure, 10 two-horse loads.

For chewing tobacco and snuff: 1. Sheep-dung, 10 to 12 loads per acre; 2. Cattle manure, 20 to 30 loads; 3. Horse-dung, 15 to 25 loads; 4. Hog manure, 20 to 30 loads. The last two are useless for smoking tobacco, or for that to be used for cigars.

The first three manures (guano, poultry-droppings, and green manure) must be followed after the tobacco crop, by a plentiful supply of stable-manure. The tobacco-stalks themselves, rotted or burned to ashes, sown over the field before the transplanting, or in the planting-furrows, will act as a good manure, but are not sufficient. In highly-worked farms, that is, where the soil is valuable, and cannot remain idle, it will pay every way, to sow rye for fodder on the tobacco land in the fall; this may be

made into hay, or turned under as manure at the beginning of July, just as may seem most profitable. Deep plowing for the rye, and afterward for the tobacco, must not be forgotten.

As a rotation for tobacco, I would recommend: first year, corn, potatoes, cabbage, or any hoed crop; second year, spring barley, with clover; third year, clover; fourth year, the clover plowed under at the beginning of June, and tobacco; fifth year, wheat, Nos. 1 and 4 to be manured. Or, if the richness of the clover is intended for wheat, which also pays well for this extra care, and if green rye is to be plowed under for tobacco; first and second year, as above; third, clover; the third growth plowed under, and wheat harrowed in; fourth, wheat; in the fall the field is plowed, and rye sown; fifth, green rye plowed under, and tobacco. Nos. 1 and 5 to be manured.

Or, if more wheat is desired, first, second, third, fourth and fifth years as above, and wheat the sixth year. Nos. 1 and 5, and if any way possible, No. 6 to be manured. I consider the last rotation the best. It will give, in six years, three straw-crops, which are much needed for manure. The grain-crop of barley and wheat is sure, and it don't happen as in the second, that a hoed crop follows the tobacco, which is also a hoed crop. Tobacco is planted on the same field again in seven years, an interval long enough not to ruin the soil. The benefit for tobacco in this rotation, consists in the lasting qualities of the green clover and rye, plowed under.

3. *Transplanting.*—As soon as the seedlings are of the size of cabbage plants, that is, having four leaves, and being four to six inches high, they are ready for transplanting. The first thing is, to lay out the land in planting-rows with the one-horse plow, as for corn, and from north to south, if a steep slope does not make another way necessary. These rows are either furrows or ridges, according to whether there is little or much rain expected, or as the soil is porous or not. The furrows give the plants shadow, and protect the soil from drouth by the sun or winds; the ridges allow all the sun, and protect from dampness. In this respect the planter must be governed by experience. Ridges and furrows may be omitted, especially in small plantations. A strong cord is stretched over the whole width of the field, by stakes at each side, and one in the middle; along this cord the plants are inserted at regular distances, which are

shown by some mark on the cord. When one row is planted, the cord is removed to the next, and the planting done in the same manner, and so on, until the field is done. This method has the advantage, that the soil may be made fine with the hoe shortly before the inserting of the plant, if it has not been done sufficiently with horse-labor. However the rows may be made, they must be equally far apart, and so with the plants in the rows. The distance of the rows and of the plants depends upon the room which the plant occupies when fully grown, and is, therefore, different with the several varieties of tobacco. Cuba is satisfied with the smallest space, while the other varieties need more. The distance apart also depends somewhat upon the richness of the soil, for very rich soil will grow larger leaves than poor soil; and then it must be considered whether the after cultivation is to be done entirely by human labor, or partly by horse-power. The farthest distance for Maryland, Virginia, and Connecticut, is with the rows four feet, and the plants three feet in the row; for Cuba, the rows three feet, and the plants two feet. In Central Illinois, we do best by making the rows three and a half feet, and the plants three feet apart in the rows for the first three varieties—so we get seven thousand Cuba, and four thousand two hundred plants of the other kinds, on the acre.

It is handy in large plantations, and even necessary, when the work is to be done with horse-power, to have a wagon-road around the field and through the centre, this makes the work at harvest-time much easier.

When the rows are made and the plants are large enough, then the planter must watch for a mild rain and one or two cloudy days. If the weather is favorable, he must lose no time, but go to work with all the hands at his disposal. Notwithstanding the hurry, everything must be done methodically and in proper order; for all carelessness in transplanting tobacco is severely punished by the necessity of renewing plants that don't grow, and up to its maturity the same care must be observed, even in selling the yield. The seed-bed is thoroughly wetted, so that the roots will not be hurt while pulling up the plants, and the earth not disturbed around remaining ones. The largest plants are taken out at first, and only as many as can be planted in half a day. As soon as taken up they are

tied in bundles of one hundred, laid in a basket and covered. They are inserted, not deeper than they stood in the bed, in a hole, made with the fingers or with a trowel, and the soil then squeezed around the plant again. This work is continued the whole day, in cloudy weather, until completed. But if there is no rain and no cloudy days, and the transplanting cannot be postponed any longer, then the grower must water the plants at transplanting, and cover them immediately after. This requires the additional help of three workmen, namely, one who waters, one that puts dry earth around the watered plant, so that no lumps will form there, and the third to cover the plants. Transplanting under these circumstances can only be done mornings and evenings, and should even be done *only* towards evening. If the weather has been cloudy at the time of transplanting, and hot weather sets in the next or the second day, then also the plants must be covered. Covering is done with light, dry leaves or straw. After the transplanting is done, care must always be taken that the plants, until they are rooted, are not suffering from moisture, and it may be necessary that they be watered a second time. Dead or weak plants must be removed and replaced by healthy ones.

4. *Work until Harvesting.*—This work is done partly for the benefit of the soil and for that of the plants themselves. The working of the soil is for keeping it open to the influences of the atmosphere and to destroy the weeds, and will forward the growth of the plant, for experience has proved that only soil that is open and free of weeds will secure the full development of the plants. Loosening and stirring the soil from time to time is, therefore, not only beneficial, but necessary, especially when the soil is hardened by heavy rains, or a crust has formed through other influences, or when weeds appear. For the first loosening, which should be done shortly after the plants have rooted, a furrow-harrow, a one-horse harrow with teeth slanting forward and the cross-beams so arranged that they can be set two to three and a half feet apart, is the best implement; for the second and third, the cultivator, or if the soil gets hardened below the surface, or when many seeds are in their way, the common corn-plow should be used. This is the working between the rows. In the rows between the plants, where the working is even more important, it must be done with the

hand-hoe. Care must always be taken not to damage the roots, and at the second and especially at the third hoeing, the soil must be drawn toward the plants, partly to protect them against storms and give them a stronger hold, and partly to absorb excessive moisture.

The soil must never be worked while wet. Where help is plenty, it is better to dispense with all horse-work; the plants can be put closer together, a larger crop is gained, less damage is done to the plants, and in closing up the account the cultivator, with human labor, will not be the loser. The working of the soil, it will be seen, is not what makes the tobacco culture so laborious and expensive. It is the *care of the plants*, of which I shall now speak.

From the first starting of the tobacco plant, it has its enemies. First appears a cut-worm that works in the soil and eats the roots off. Then comes a little caterpillar which enjoys itself on the young leaves, and lastly the beautiful and large tobacco-worm, which eats into the leaf, and in a short time leaves nothing but the leaf-stems and stalk. The only remedies against these enemies are the vigilance and industry of the planter—looking after them, digging up, picking and destroying once or twice a day, or often as there are any traces of them. Children, to whom premiums are offered, will be very successful in destroying them. (Premiums are a very good thing all over, and are the reason why this treatise is written.) A herd of turkeys, if given access to the tobacco-field, are a very valuable help. A negro from South Carolina told me a few days ago, that a solution of blue vitriol in water, sprinkled over the plants, will kill the worms. The remedy may be worth trying. Of course the solution must be made weak enough, so that it will not destroy the plants as well as the worms.

Priming.—The object of priming is to break off the leaves that come out too near the ground, which when large lie flat on it, and, therefore, rot or get dirty. This work should be done early, the sooner the better, so that the plant does not lose much strength by their growing. The leaves must *not be torn* off, especially not downward, because the plant would be injured, and instead of throwing the strength gained into the other leaves, it would be thrown away to heal the wound. The distance from the ground this priming should be done, depends

upon the variety grown and upon the time at which the work is done: four to six inches is the right distance. This priming is not done by every one. One farmer may practice it, while his neighbor does not; but sorts the lower leaves separately, and sells them as so-called "lugs," for which he gets a little over half the price of the good upper leaves. Those who do not prime, must generally *top* lower, or they must risk that the whole plant, or at least the upper leaves, will not mature fully.

Topping is done to throw the strength, which would go to develop seeds, into the leaves. It must, therefore, be done as early as the seed-buds show themselves, if not earlier. This work *must* be done, and the question is, how to do it. If there are but few leaves on the plant, even these will not ripen, if it is not topped; if there are many, then the grower has the choice either to break off the flower-stalk only or to take off one or more leaves also. This should be done in answer to the questions: 1st. Is there time enough to ripen even the upper leaves fully? and 2d. Are the plant and the soil strong enough to ripen all leaves, even the upper ones? The answers to these queries will decide the way of topping. If yes, he takes off the flower-stalk only; if no, he tops to eight, ten, twelve, fourteen or sixteen leaves, according to his judgment, that is, he allows so many leaves to remain on the plant. Here will be seen the importance and benefit of starting the plants early from seed. This alone may increase the yield one-half.

Suckering follows shortly after topping, and is done for the same reason—to concentrate the strength of the plant in the leaves. A sucker is a little branch appearing at the place where the stem of the tobacco-leaf joins the stalk. They draw off nutriment, while they will never be good for anything, and, therefore, must be removed. This is one of the tiresome operations in tobacco culture, for these suckers do not all appear at the same time; they first appear on the lower leaves, and then on the middle, and lastly at the top leaves. They even push out again sometimes after they have been removed. They demand the planter's whole attention, and he has no rest on account of them, until the plant is fully matured.

Priming, topping and suckering must not be done during a rain, or when the dew is on the plants, or they will get rust-

spots, which will get larger every day and at last destroy the whole leaf.

Harvesting.—The maturity of tobacco is seen, if the leaves, which were green up to now, when held against the sun, show yellowish, reddish or brownish spots, feel sticky, and when bent break off short and clean. Before this period sets in, the *drying-house* should be in good order. The house is built to give room for the free hanging up of the tobacco, so that it is protected from the sun, wind and rain, and is allowed to dry by the free circulation of the air. Any building, therefore, will answer which has a good roof, boarded sides, and enough windows and air-holes (which can be closed at will) to keep up a mild circulation of air inside, and also to keep out strong and too quick drying winds. If the tobacco is grown on a large scale, the house should have large doorways to drive a wagon in and out. There must be sticks all over the house, either cross or lengthwise, and these sticks must be ready and in their places. Now the work of harvesting the crop is commenced on a clear or cloudy but not rainy day. The mature plants (those not ripe are left longer on the field if not too late in the season) are cut off near the ground, two of them tied together by the butt-ends and hung up in the field on riders, which rest on two forks fastened in the ground, and they are left there until evening to wilt; then they are brought to the drying-house and hung up. The tobacco is hung up on the upper sticks first, and the work continued downward; care is taken that the sticks are six to eight inches apart, also that the plants are not too near together on the sticks, because the air should have free passage among the plants, and when they touch or rub against each other, unsightly spots are produced. The sticks must be pretty wide, so that the two plants which are tied together, and one of which hangs on each side, are held well apart. Later, when the tobacco has dried off somewhat, the sticks and plants may be moved a little nearer to each other; but the plants on the upper sticks must not touch those on the lower; they should be so arranged that one lower stick is just in the middle of the space between two upper ones.

Another method of harvesting may be followed by those who cultivate tobacco on a small scale, or who have hands and

time enough. As all the leaves on the plant do not ripen at the same time, but the under leaves are always a little earlier than the upper ones, they may gather the crop in the leaf, that is, taking only the matured leaves from the stalk; this must be done daily, and so long as there are leaves on the stalk. In this way the crop will be harvested slower, and it will cost more, but the tobacco will be of more even quality and better. The leaves are strung on strings instead of being hung up on sticks, with the same care and precautions as recommended for hanging up the whole plants. After the leaves are off, the stalks must be cut off or pulled up, for they would still vegetate, and needlessly take away nourishment from the soil.

No more tobacco leaves or plants should be cut than can be taken to the drying-house and hung up the same day. Mild, clear weather will be beneficial for drying; strong and rough winds will do it too quick, and wet, damp weather will hinder it altogether. Should the latter continue for some time, the place of the sticks or strings must be changed, and if, notwithstanding this, the tobacco gets mouldy, it must be "fired." A fire is built in one or more excavations in the ground of the house, and the heat and smoke are allowed to go as evenly as possible through the plants. Care must be taken that the fire does not get too near the tobacco, so that it gets singed or burned. The place directly above the fire should, therefore, be free of tobacco. Stoves, with pipes to convey the smoke (which is of no value in drying) outside of the house are still better. The heat in the house may be kept up to eighty or ninety degrees.

The best arrangements for drying will not be of much avail unless the tobacco has been fully matured before harvesting, for if this has not been the case it will never lose the well known "green taste," and no after manipulation, no drying or sweating, will free it.

Curing.—When the leaves are dry, which is seen when the stems become of a brown color, and break when bent, the next work is to make *tobacco* out of them, for up to now we have nothing but a tasteless, dry weed. Its hidden qualities must be developed. This is done by a process of fermentation, the *sweating of the tobacco.*

The leaves are broken one by one from the stalks, in damp

weather, (otherwise they would break,) stretched out nice and even, and, with the ends in the same direction, put up in heaps. These heaps, of which every workman makes one, are afterwards put into one or more large conical heaps, from four to six feet in diameter at the base, and from one and a half to two feet at the top. These are covered with woollen blankets, straw mats, or anything that will press the heap lightly and shut out the air. In twenty-four to thirty hours a fermentation sets in, the heap gets warm, and when it is so hot inside that the hand cannot bear it very well, the heap is broken up and packed over again, pulling the tobacco that had been outside upon the inside, and *vice versa*, and treating the same way as at first. In such heaps the tobacco remains twenty to forty days, until all the heat is gone; then the heaps are again broken up in damp weather, the leaves tied up in bundles of one-half to one pound in weight, stretched even and packed in boxes or hogsheads, pressed tightly and covered. Now the tobacco is done—is a saleable article.

The process of sweating must be conducted with every possible care, for on this depends the color of the tobacco, and in a large degree its fine flavor. If the fermentation is too strong, the tobacco gets black and the flavor is driven out; if too little fermented, the color remains green and whitish yellow, and the flavor is not developed.

Those who raise the plant principally to get wrappers for cigars will need to sort it.

Sorting is done right after the last breaking up of the heaps, and consists in laying the damaged leaves apart from the whole ones; and these again are separated, according to color or other qualities, for wrappers, into two, three, or four different kinds, so that every variety is of the same quality and color.

First quality—Color, dark brown; even over the whole leaf.

Second quality—Color, light brown; even.

Third quality—Color, dark yellow; even.

Fourth quality—Color, light yellow; even.

Fifth quality—Color, green, black, whitish yellow, spotted.

The first four kinds include the larger leaves, while the smaller ones go into the fifth quality.

Every kind is bundled by itself. This work is not difficult, and increases the price considerably. The first three sorts, and

even the fourth, may be sold as wrappers, which bring the highest price. The fifth is mixed with the damaged leaves together, and sold for fillers, or chewing tobacco and snuff.

An excellent article on Tobacco Culture in Maryland is printed in P. O. Rep. Agric. for 1867, by Mr. Walter Bowie. Bibb & Co. "Patent Tobacco 'firing and curing' apparatus" is highly recommended.

JAMESTOWN WEED; THORNAPPLE; STRAMONIUM, (*Datura stramonium*, Linn.) Diffused; grows abundantly in upper and lower districts; Newbern. Fl. July.

Trous. et Pid. Traité de Thérap. et de M. Méd. i, 230; Orfila, Traité de Toxicol. Journ. Univ. des Sci. Méd. 47, 227; Ell. Bot. 276; Drayton's View, 63; Edin. Med. and Surg. Journal, vii and viii, 1812; Trans. Med. Chirurg. Soc. Edin. i, 285; Archives Générales de Méd. iv, 373; Méd. Chirurg. Trans. Lond. vii, ann. 1806; Bell's Pract. Dict. 434; Eberle, Mat. Med. ii, 80; Ed. and Vav. Mat. Méd. 438; Pe. Mat. Med. and Therap. ii, 308; Frost's Elems. Mat. Med. 460; U. S. Disp. 688; Watson's Pract. Physic, 197; De Cand. Phys. Veg. i, 354; Bayle, Bill. Therap. ii; Big. Am. Med. Bot. i, 17; Woodv. Med. Bot. 74, 197; Traité de Chimie, 81, 319; Paris's Pharm.; Bart. Essay Form. Mat. Med. 48; New England Med. and Surg. Journ. iv, 226; Med. Chirurg. Trans. vii, 2; Ball. and Gar. Mat. Med. 346; Cullen. Mat. Med. ii, 281; Bergii, Mat. Med. i, 122; Mér. and de L. Dict. de M. Méd. ii, 593; Bull. des Sci. Méd. de Férus, xi, 197; Lindenstolpe, de Venenis, 531, *op. cit.;* Sauvage, Nosol. ii, 430; Greding, in Ludwig's Adversaria, i, 345; Murray's Apparat. Med. i, 670; Fowler, in Med. Comment. v, 161; Adhelius, cit. in Med. Com. Phil. Trans. Abridg. vi, 53; Rush, in Phil. Trans. i, 384; Schœpf, Mat. Med. 25; Wedinburg, Med. Comment. iii, 18; Beverly's Hist. Virginia, 121; Med. and Phys. Journal, xxv, xxvi; Cooper, in Caldwell's Thesis, vol. i; Shec. Flora Carol. 497; New York Med. Repos. ii, 27; Lind. Nat. Syst. Bot. 294.

A well known narcotic and anti-spasmodic, employed in mania, epilepsy, chorea, tetanus and palsy.

Bergius frequently saw maniacs restored to perfect saneness of mind, which they never afterward lost, by the continued use of the extract of our common *stramonium;* and by the same means he effectually cured the delirium so often attendant upon childbirth, where every other remedy had proved abortive.

Bull. des Plantes Vén. et Suspect. de France, i, 38; Dém. Élém. de Bot. ii, 75; Milne, Ind. Bot. 285. Adhelius states that of fourteen patients who suffered under epilepsy and nervous affections in a hospital at Stockholm, eight were completely cured, five relieved, and only one received no benefit. Thornton's Fam. Herb. 188; Woodv. Med. Bot. ii, 339; Storck, i, c. 5; Kames in Comm. Nov. 1733, p. 251; Lobsten, Epistle ad Gurren, Plantes Vén. Alsat. Eph. Nat. Cur. cent. ix, obs. 94; Huckel in Comm. Nov. 1744, 14; Barrex, Essai sur l'Hist. Nat. de la France, 48; Buchner, Misc. Phys. Mat. 122. The seeds are soporific, and are said to induce delirium and a partial forgetfulness, and to be used by women in the East for purposes herein stated, viz: "*Ab India alia inebriantia et aromatica in electuarium recipitur semen, ad grata phantasmata cienda, et, ut quidem volunt, quo ad celera patranda, tanto audaciores evadant.*" Kæmpher, Exotic, 650. "*Somnum facit adeo profundum ut impune pudicitia puellæ violari possit, quæ hoc toxicum sumserit.*" Haller, t. c. "*A mulieribus infidis Turcis gynecœis inclusis, ad consopiendos et dementandos maritos, quo aliorum majis desideratorum amplexibus satientur, usurpari, et Hamburgi a vetula sic honestam feminam, quo se inscia mœchum, admitteret, intoxicatum narratur.*" See Lindenstolpe, de Venenis, 531; Mér. and de L. Supplem. to Dict. de M. Méd. 238, 1846. Dr. Begbie has given the extract with great success, in doses of one-quarter to one-half grain every four hours, in many cases of neuralgia. Révue Méd. iii, 57, and iv, 414. Dr. Fott relates the case of a young lady who was cured in six weeks of the tic douloureux by using eight to fifteen drachms of the tincture. Gazette de Santé Janvier, 1830, p. 8; Emploi du Stramonium dans l'Asthme Nerveux, Paris, 1835. Series of observations in relation to the use of the dried leaves as a purgative in the treatment of asthma, (in French.) Bull. de Thérap. vi, 12, 336. Ducros' Observations on the efficacy of the leaves of *Dat. stramonium* in a case of angina pectoris, from the Bull. de Thérap. vii, 93. Serres' Observations on the employment of extract of Stramonium in facial Neuralgia. Bull. de Thérap. xiv, 51. F. Moreau, Mém. on treatment of Hallucination by Stramonium in Gazette Médicale, 373, 1841; see, also, Bibliothèque de Thérap. by M. Bayle, ii, 249. Lindley, in his Natural System, says it is more particularly applicable in "mania without fever." Tho remedies for

poisoning by this plant are a speedy emetic, the free use of vegetable acids, strong coffee, etc. Dr. Fisher, President of the Massachusetts Medical Society, found stramonium useful, remarks Bigelow, in those cases of epilepsy which are diurnal or have regular returns. It was unsuccessful in those which did not observe any regular period. In tic douloureux of long standing it is advised that it be taken in large doses, and that the system be kept under its influence. The leaf, prepared and smoked as tobacco, has been found to act as a palliative in asthma; the root being useful in this respect. The remedy should never be used in plethoric cases, unless preceded by ample depletion. (U. S. Disp.) From the observations of Dr. Marcet, Phys. Guy's Hosp., taken internally it had proved very effectual in removing acute pains, and in those arising from chronic diseases, acute uterine affections, for instance. Decided benefit was obtained from it in four cases of sciatica, and in two others complicated with syphilitic pains. Eberle used it in this disease with entire success; and he states that his trials with it in rheumatism were exceedingly flattering. Dr. Chapman administered it in dysmenorrhœa. The employment of the ointment in allaying pain was known as far back as the time of Gerarde, 1507. It is efficacious in changing the condition and promoting cicatrization; acetate of lead being employed with the ointment as an application to painful and irritable ulcers and hemorrhoidal tumors. Preparations of *stramonium* applied to the eye, it is well known, diminish sensibility and dilate the pupil. I have seen the extract employed to a large extent in the New York Eye Infirmary, in which institution it had entirely taken the place of belladonna as an application for dilating the pupil. Its virtues reside in an extractive principle, which is dissolved by water. The powder should be kept in closely stopped bottles; the juice may be pressed out of the leaves with a bag. The ointment may be made with a pound of the fresh leaves simmered in three of lard until the leaves become crisp, then strained and cooled gradually. Griffith Med. Bot. 461. It is often applied in inflammation of the breasts. The fresh leaves are often used as a dressing for wounds.

An ointment made by stewing the seeds of the plant in lard and straining it, has a most soothing effect upon piles and in

irritable or inflamed conditions of the fundament accompanied with pain. I have known several cases in which it has given entire relief. It may be injected or the parts anointed with it. I make frequent use of the leaves in the formations of poultices for abdominal and other pains, where soothing applications are required.

The peculiar properties of this plant depend upon a principle called *daturia*, very analogous to *hyoscyamia*, slowly dilating the pupil and exercising a poisonous influence. Mr. Morries, in Ed. Med. and Surgical Journal, xxxix, 379, has described an empyreumatic oil obtained from it, closely allied to that from the foxglove. *Stramonium* is stated to be an acro-narcotic, very similar to belladonna, but acting in a more marked manner upon the secretory functions. Chapman says it is considered useful rather in allaying the excessive mobility of the system than in tending to the absolute cure of the complaint; referring to its effects in mania and epilepsy. Dr. Marcet regards its operation on the bowels as relaxing rather than astringent. The ointment has been recommended in nymphomania, to lessen venereal excitement. The dose of the powdered leaves is one grain, of the seeds half a grain; of the extract of the seeds one-quarter of a grain, from the leaves one grain; of the tincture ten drops, to be increased if necessary. The tincture is made with four ounces of the bruised seed to two pints of diluted alcohol—macerate for fourteen days. In dilating the pupil with the extract, preliminary to examination of a diseased eye by the catopric test, I have repeatedly found it to allay supra-orbital pains. To relieve the latter, so often a distressing concomitant, we frequently prescribe it, with equal parts of mercurial ointment and thirty grains of mur. morphiæ, as a local application. The plant while young and tender is readily collected, and eaten as a salad by soldiers in camp.

I offer no apology for inserting the following relation which appeared during the war, for it only confirms statements expressed above:

It is not generally known that the Jamestown or Jimson Weed possesses almost the narcotic and soporiferous effects of the gum opium or the celebrated Egyptian "hash-heesh;" but such, we are assured, is the fact. A gentleman of undoubted veracity gives his experience in experimenting on its soporiferous qualities as follows:

"I was," says he, "tormented with toothache; and having tried every known remedy available without experiencing any relief, I was one day advised by an acquaintance to try the effects of the Jimson weed, which he said he had never known to fail. His manner of application was, to gather up the seed from the pod, and smoke them in a common tobacco pipe. Eager to do something to alleviate my misery, I did as he directed, and the result will show that it came near being the last act of my life.

"I procured the seed and proceeded to smoke, and soon found that my misery was almost visibly abating, and that the effects of smoking were pleasant in the extreme, and momentarily growing more so. Without knowing the properties of the weed, and being so much elated at the calm that had succeeded, I continued to smoke on, momentarily growing more etherial, as I imagined, until finally I lost all terrestrial feelings and sympathies. Though possessing my faculties of understanding unimpaired, I was possessed of feelings whose incomparable happiness might have been envied by a houri. Visions, whose magnificent splendor surpassed the most vivid Oriental imagination, were mine; stars, the most brilliant yet discovered, within my sight; and music, the most delicious that ever syren sung, or that ever emanated from the harps of the muses, greeted my ears. My organs of sight were increased to such an extent that I could comprehend objects millions of miles distant. The machinery of the universe was laid open to my sight, and I could see the myriads of planets as they trod the measured distances of their orbits, all in swift but mechanical regularity.

"There was nothing my imagination could conjecture which was not almost tangibly visible. Rainbows of the most magnificent dyes were before me; chariots of the most precious metals were constantly passing and repassing before my vision, and, amidst all the wild confusion of beauty and grandeur, came measuredly the sublimest harmony of sweet sounds that made my soul swell within me.

"All the time I was perfectly conscious of surrounding objects and events, but requested to be left alone to the enjoyment of my translation, when my wife, seeing the deadly palor which was overspreading my countenance, sent immediately for a

physician, who arrived while I was yet in my revery of the beautiful and sublime.

"Finally, the vision faded from my view, and most unwillingly I began to return to dull mortality; but with nerves out of order, and my whole system relaxed and unstrung. It was days before I recovered finally from the effects of it; but my tooth was cured, and has never ached since. I would advise all who may read this not to let their curiosity prompt them to try the experiment, as it is attended with unknown danger."

This plant being found so abundantly, and being possessed of such decided narcotic and sedative properties, much more use should be made of it in the composition of poultices, and where soothing and hot applications are required. It is believed by many to prevent tetanus and spasm when applied locally to painful wounds, ulcers, etc. It is largely used as a domestic remedy on our plantations, and with advantage.

PURPLE THORN-APPLE, (*Datura tatula*, L.) Grows around Charleston. Fl. July and September.

U. S. Disp. 690. "It possesses very much the same properties as the *D. stramonium*," of which it is classed in Chapman's Bot. as a variety. Mér. and de L. Dict. de M. Méd. 599. The decoction of the leaves is employed in leprosy. Dict. des Drogues, ii, 56. Said to be aphrodisiac.

Datura Metel, L. Int. N. and S. C. Curtis.

D. metel, an Indian species, has long been known for its soporific and intoxicating powers, and has frequently been employed with criminal intention; Fleming Cat. Med. Pl. Belou, in his "Singularities," 460, refers quaintly to it. He says that it gives sleep to the restless, makes people joyful, and removes the remembrance of things which cause melancholy and low spirits. See the original in French, in Griffith's Med. Bot. The seeds of the plant were considered to be aphrodisiac, and are said to have been used by courtesans in India and Turkey. *Op. cit.*

GENTIANACEÆ. (*The Gentian Tribe.*)

Characterized by intense bitterness.

SAMPSON'S SNAKEROOT; BLUE GENTIAN, (*Gentiana Elliotii*, Chap. Fl. *Gentiana Catesbæi*, Ell.) Damp soils along rivulets; collected in St. John's Berkeley; vicinity of Charleston; grows in Georgia also; Newbern. Fl. September.

Big. Am. Med. Bot. ii, 138; U. S. Disp. 348; Bell's Pract. Dict. 218; Mér. and de L. Dict. de M. Méd. iii, 361; Coxe, Am. Disp. 304; Frost's Elems. Mat. Med. 359; Griffith Med. Bot. 461. An excellent bitter tonic, "little inferior to the European gentian," introduced to notice by Dr. McBride, of St. John's Berkeley, South Carolina. It is frequently prescribed with advantage in pneumonia, attended with typhoid symptoms, and in dyspepsia. The virtues reside in a bitter extractive principle, soluble in water and alcohol. It may be advantageously combined with chalybeates. It is employed to some extent in popular practice at the South, and is found of much service as a substitute for bitters; I have frequently prepared and used it as such. The decoction is the form prescribed in pneumonia. The saturated spirituous tincture is advised in dyspepsia and in debility of stomach, in doses of one-quarter to one-half of a fluid ounce. The root is officinal; dose of the powder from fifteen to thirty grains. The compound infusion is made with one-half ounce of the root, orange peel and coriander, each, one drachm, cold water twelve fluid ounces, macerate for twelve hours; dose, one fluid ounce. Dose of extract, ten to thirty grains. Given before meals it invigorates the stomach, increases the appetite, and prevents acidification of the food. In a fresh state these plants are said to prove cathartic in large doses.

For extraction of "bitter principle" in plants, see Rural Cyc. 435, vol. i. It is believed by many that the use of bitters in spring and autumn will counteract the action of malaria. They certainly prevent debility, and increase the digestive and nutritive powers, and thus indirectly act as prophylactics, even when they possess no positive virtue as anti-periodic agents. The various species of gentian, thoroughwort, *sabbatia*, dogwood, poplar bark, willow, pipsissewa, or winter-green, wild cherry bark, *sarracenia*, etc., supply useful bitters. They may be collected and prepared by any one. Cold water extracts bitters, and alcohol may be added to preserve the infusion. I have prepared and used a tincture of the wild gentian since the war as an economical substitute for the tincture of bark.

Gentiana purpurea, *rubra*, and *lutea* are used in England as substitutes for hops. No doubt our species would serve the same purpose; at any rate, they will give a bitter tonic property when used in the manufacture of ale, beer, etc.

Gentiana ochroleuca, W. Grows in damp soils; collected in St. John's; vicinity of Charleston. Fl. September.

Ell. Bot. Med. Notes, 340. It possesses properties somewhat similar to the above.

Gentiana saponaria, L. *G. catesbæi*, Walt. Vicinity of Charleston.

Griffith Med. Bot. 461.

INDIAN QUININE; AGUE WEED, (*Gentiana quinqueflora*, Frl.) This and the *G. sap.* are esteemed fully equal to the imported gentian. In large doses they are said to be laxative. Dr. E. P. Wood, of Wisconsin, has given this plant with success in intermittent fever. Trans. Ill. State Med. Soc. 1857.

AM. CENTAURY, (*Sabbatia angularis*, Pursh. *Chironia*, Linn.) Grows in low soils along rivulets; collected in St. John's; vicinity of Charleston.

Ell. Bot. Med. Notes, i, 385; Chap. Therap. and Mat. Med. 438; ii, 417; U. S. Disp. 611; Pe. Mat. Med. and Therap. ii, 344; Royle Mat. Med. 475; Eberle, Mat. Med. i, 307. See Chironia, Big. Am. Med. Bot. iii, 147; Bart. M. Bot. 1255; Ed. and Vav. Mat. Méd. 1176; Barton's Collec. i, 15; Lind. Nat. Syst. Bot. 297; Griffith's Med. Bot. 459; Frost's Elems. Mat. Med. 529. "This is a pure bitter, with tonic and stomachic properties." Bigelow does not hesitate to attest its utility; and Eberle considers it one of the most valuable of our indigenous remedies of this class; employed in domestic practice in intermittent fever, but principally to invigorate the stomach and alimentary canal. Barton says it was given with success in certain stages of the yellow fever. The cold infusion of one ounce of the herb to one pint of boiling water, taken in doses of a wineglassful every two hours, may be used, or thirty grains to sixty grains of the powder, which also acts as a vermifuge. The decoction, extract and tincture may be used.

Sabbatia stellaris, Ph. (Prodrom.) *Sabbatia gracilis*, Mich. Ell. Sk. Grows in damp soils; Newbern; vicinity of Charleston; collected in St. John's; sent to me from Abbeville by Mr. Reed. It possesses properties similar to the above.

INDIAN LETTUCE; AM. COLOMBO, (*Frasera Carolinensis*, Walt. *Frasera Walteri*, Mich.) Found in Fairfield and Abbeville Districts; Newbern.

This genus was named after his friend Fraser, by Mr. Thomas Walter, who resided on the Santee, where he cultivated many of the plants described in Latin in his "Flora Caroliniana;" London, 1788. The writer will be pardoned for making this reference to a maternal ancestor, one of the earliest contributors to the Botany of the South, from whom has been derived a partiality for similar pursuits. A translation of this volume in English, in MSS., by Governor John Drayton, is preserved in the Charleston Library.

Ell. Bot. McBride's Note, i, 205; Drake's Cincinnati, 86; Bart. Veg. Mat. Med. iii, 107; Raf. Med. Fl. i, 196; Coxe, Am. Disp. 297; Frost's Elems. Mat. Med. 534; Mér. and de L. Dict. de M. Méd. iii, 291; Griffith's Med. Bot. 463. "A pure, powerful and excellent bitter, destitute of aroma." Lind. Nat. Syst. Bot. In the recent state it is said to possess considerable emetic and cathartic power; the root is employed as a tonic and febrifuge, and is substituted for the officinal colombo with equal advantage, given during the convalescence from fevers. By the analysis of Mr. Douglass, Am. Journal Pharm. vi, 157, it contains bitter extractive, gum, tannin, gallic acid, resin, fatty matter, sugar, etc. Griffith, in Journal Phil. Coll. Pharm. iii, 269. In the recent state it is employed as a substitute for rhubarb, in doses of thirty grains to one drachm of the infusion of one ounce of the root to one pint of boiling water, of which a wineglassful may be taken three times a day. It should be collected in the autumn of the second or spring of the third year. The root before being dried should be cut in transverse slices. An infusion is made with one ounce of the bruised root to one pint of boiling water; dose, one or two fluid ounces. It is also useful prescribed as a tonic. This plant holds a deservedly high rank among our native tonics, and I would recommend its employment to those residing in localities where it may be found. The tincture is given as a tonic, and the powdered plant applied externally to ulcers in the form of a poultice for its anti-septic powers.

SPIGELIACEÆ. (*The Wormseed Tribe.*)

CAROLINA PINK-ROOT, (*Spigelia Marylandica*, Walter.) Abundant in the lower portions of Carolina; collected in St. John's; vicinity of Charleston. Fl. May.

Lining, Essays and Obs. Phys. Lit. South Carolina, i, 386; Garden's Essay Phys. and Lit. iii, 145; Ell. Bot. Med. Notes, 237; Eberle, Mat. Med. ii, 376; Chalmers on the Weather and Diseases of South Carolina, i, 67; Frost's Elems. Mat. Med. 187; Le. Mat. Med. ii, 377; Big. Am. Med. Bot. i, 142; Home, Chim. Exper. 420; Murray's App. Med. i, 548; Royle, Mat. Med. 469; Thompson's Inaug. Diss. Fenella, Journal de Pharm. ix, 197; Griffith, Phil. Journal Pharm. 1833; Bell's Pract. Dict. 433; Ed. and Vav. Mat. Méd. 595; Pe. Mat. Med. and Therap. ii, 344; U. S. Disp. 680; Ball. and Gar. Mat. Med. 334; Bergii, Mat. Med. i, 96; Mér. and de L. Dict. de M. Méd. vi, 502; Coxe, Am. Disp. 128 and 558; Bull. des Sci. Méd. de Férus, xi, 301; Lind. Nat. Syst. Bot. 299; Bart. Am. Med. Bot. ii, 80; Woodv. Med. Bot. ii, 289. See Dr. Brocklesby's Obs. Med. 282; Griffith's Med. Bot. 466. This plant is a well known indigenous anthelmintic, possessed of narcotic and cathartic powers. Dr. Barton found it also useful in the fevers of children not proceeding from verminous irritation, as from those, for instance, consequent upon hydrocephalus. The root contains a heavy, gross and volatile oil, a small quantity of resin, a peculiar bitter substance, *spigeline*, albumen, gallic acid, salts, etc. See Anal. Journal de Pharm. ix, 197. According to Feneuille, *spigeline* is bitter, nauseant and purgative, and produces a sort of intoxication (ivresse.) The root is much more active in the recent state. With senna, it forms the well known and efficacious remedy called worm-tea: composed of spig. half an ounce; senna two drachms; savin half a drachm, and manna two drachms—to be infused in a pint of water and strained, of which one to two ounces may be given to a child. This dose does not excite narcotic symptoms. Chalmers' Hist. of South Carolina. Dr. Lining, of South Carolina, gave twelve grains of the root of this plant to an infant morning and evening; ten to twenty grains may be given to one of seven, and one drachm to an adult, repeated two or three times a day; or an ounce of the root infused in one pint of water, of which a half may be taken by an adult, and one or two spoonsful by a child. When a full dose is given at night, it is well to follow it by a purge in the morning. Dr. J. P. Thomas informs me that his children drink the pink-root tea habitually as a beverage, and prefer it to the hyson; and in this way it proves prophylactic against worms.

APOCYNACEÆ.

It contains species with purgative, acrid, and febrifugal properties.

Forsteronia difformis, D. C. Prodrom. *Echites difformis*, Walter and Ell. Sk. A vine found sparingly in South Carolina; collected in St. John's, on Sarrazin Pl. (Mrs. I. S. Porcher's;) found also in the vicinity of Charleston.

Mér. and de L. Dict. de M. Méd. iii, 51. With milk, it is used as a wash for freckles. The juice is said to be sufficiently caustic to destroy worts and scirrhous excrescences. Any portion of the plant will coagulate milk.

The juice of our species of *Echites* and *Forsteronia* (*E. difformis*, Ell. and Walt.) should be examined, for from this genus is obtained the highly poisonous *Woorari* (from *E. suberecta*) growing in Jamaica.

INDIAN HEMP; DOG'S-BANE; AMY-ROOT, (*Apocynum cannabinum*, L. *A. pubescens*, Ell. Sk.) Grows along fences in wet soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Bell's Pract. Dict. 61; Pe. Mat. Med. and Therap. ii, 365; Journal Phil. Coll. Pharm. v, 136; Am. Journal Med. Sci. xii, 55; Dr. Griscom, in *op. cit.;* U. S. Disp. 108; Am. Med. Rev. iii, 197; Ball. and Gar. Mat. Med. 338; Mér. and de L. Dict. de M. Méd. i, 368. This is a powerful emeto-cathartic, producing diaphoresis, and expectoration, inducing also a tendency to sleep, independent of the exhaustion consequent upon vomiting. The evacuations brought on by it are large, feculent and watery; and they are succeeded by perspiration. Am. Journal Med. Sci. *loc cit:* "It diminishes the frequency of the pulse and induces drowsiness." This plant is one of our most powerful hydragogue cathartics and diuretics, and has frequently cured aggravated cases of ascites. It acts so decidedly in draining the system that Dr. Rush called it the "vegetable trocar." I have seen it used with advantage in dropsy by Dr. V. Mott among his clinical patients; he employs it in cases of tonic dropsy, being too active for those of an atonic character, where iron would have been advisable. Dr. Knapp states, in his Inaug. Thesis, that fifteen to twenty grains of the powdered root would induce vomiting; he gave it in intermittent fever, in pneumonic

affections, in dysentery, and as an alterative in enteritis. Dr. Jos. Parrish cured an aggravated case of ascites by the decoction of the plant, and Drs. Knapp and Griscom have found great service from its use in this disease. Am. Jour. Med. Sc., xii, 55. Dr. R. S. Cauthorn, of Rd., Va., has employed the bark of the powdered root in six grain doses, increased to three times the quantity, with success in the treatment of intermittent fever. Va. Med. Jour., ix, 425; U. S. Disp., 12th Edition. I had reported its use in this class of fevers in my Report on Med. Bot. of S. C., 1849. It acts as a sternutatory, and the fresh juice has been employed as an external application in some cutaneous affections. By chemical analysis, it is shown to contain tannin, gallic acid, gum-resin, wax, fecula, caoutchouc, and a bitter principle, *apocynin*. Mérat states, in the Supplem. to the Dict. de M. Méd. 52, 1846, that the preparation called *apocyne* combines all its valuable constituents. Révue Méd. Oct. 1833, and Journal de Chim. Méd. x, 95 et 567; see, also, Griffith Med. Bot. 449. For its hydragogue or diuretic effect the decoction, made with one ounce of the root in one pint of boiling water, is given in doses of a wineglassful three times a day. The bark furnishes a fibre resembling hemp, of a whiter color, and superior in durability; and the decoction affords a permanent dye, brown or black, according to the mordant used.

"This plant has been proved by Prof. Thouin, of Paris, to possess a stronger fibre than that of hemp; and it is used by the American Indians for making cordage, fishing nets, and coarse cloth. The name alludes to the noxiousness of the juice to dogs." Rural Cyc. See *Urtica*, *Linum*, *Asclepias*, for plants containing textile fibres.

In St. John's Berkeley, S. C., this plant is known as "Amy root, or General Marion's weed," from its having been a favorite remedial agent in the camp of the partisan leader, and is esteemed to possess great virtues in arresting intermittent fevers; used as a substitute for quinine. It is generally given steeped in whiskey, or a decoction may be drunk as a tea. As the plant is also purgative, it affords a singular example of a bitter and a purgative united, hence its applicability as a stomachic in constipation, dyspepsia, and depraved conditions of the nutritive organs. A subject of violent asthma assures me that the decoction gives her more relief than any other agent tried, possibly

by promoting digestion. I have used it repeatedly since and always with benefit, no doubt dependent upon the nausea relaxation and catharsis following its use. I have had detailed to me a very aggravated case of dropsy cured by the use of this plant in decoction, and I have seen it relieve two very aggravated cases under my own care. A patient with dropsy in the City Hospital, August, 1857, was purged and vomited violently by one wineglassful of a strong decoction which I ordered him, and I have seen it act upon delicate persons with entirely too much activity, so that it should not be used in too large doses. Dose of powdered root, fifteen to thirty grains. See next species.

Dr. J. G. Goss in a paper in Tilden's Journ. of Mat. Med. pb. 1868, recommends the combination of three to five grains each of cannabinum and nitrate of potash as a diuretic to be given every two or three hours; or that the infusion should be combined with that of pipsissewa, one ounce of the former to two of the latter given every three hours. I have no doubt from my own experience with both agents that such combinations would be serviceable in ascites and anasarca.

Dr. Goss states that a few grains of the apocynum given twice a day will remove ascarides. The active principle, the *apocynin*, is recommended by some recent writers in doses of fractional parts of a grain several times a day for its influence as a catalytic agent in hastening the disintegration and discharge from the system of the nitrogenous element, urates, phosphates, etc., hence useful in fevers, rheumatism and blood diseases.

DOG'S-BANE; BITTER ROOT; MILK WEED, (*Apocynum androsæmifolium*, L.) Grows in damp rich soils; vicinity of Charleston.

Big. Am. Med. Bot. ii, 148; Mér. and de L. Dict. de M. Méd. i, 368; Coxe, Am. Disp. 85; Kalm's Travels, 326; Griffith Med. Bot. 450. Thirty grains of the powder of the recently dried root is emetic and diaphoretic, causing scarcely any previous nausea; so that it is suitable for evacuating the contents of the stomach without producing exhaustion or relaxation of the muscular system. It operates in this way as effectually as two-thirds of the quantity of ipecacuanha. The active property is diminished by keeping. As a diaphoretic, it is best combined with one grain of opium. Dr. Zollickoffer considers it a

useful tonic in doses of ten to twenty grains. The Indians use it in lues venerea. Mér. and de L. Dict. de M. Méd. It is also employed by the vegetable practitioners. See Howard's Imp. Syst. Bot. Med. 291. It is supposed to contain a bitter extractive principle, a coloring principle, soluble in water, caoutchouc, and a volatile oil. The wounded plant emits a copious milky juice. Dose as an emetic forty grains; as a diaphoretic, the same quantity, with one grain of opium; as a tonic or alterant from ten to twenty grains.

The properties mentioned above closely resemble those ascribed to the "Amy root" (*A. cannabinum*) by residents of St. John's, South Carolina, viz: a laxative united with a bitter principle

The Eclectics use the active principle *apocynin*, extracted from both of our native species, in doses of two grains, two or three times a day. (See New Remedies by Wm. Paine.) It is stated that administered in half grain doses every hour, nausea may be kept up for a considerable time. They use it as a depuratory agent, as an aperient alterative and tonic in secondary syphilis, jaundice, constipation and dropsies, and often combine it with podophyllin, asclepin, hydrastin, etc. The dose of Tilden's Fluid Extract of *A. andros.* is ten to twenty drops, of the solid extract two to eight grains. The analogous preparations from the *A. cann.* are given in somewhat smaller doses.

ASCLEPIADACEÆ.

Roots generally acrid and stimulating. Some of them emetic.

Gonolobus macrophyllus, Mich. Variety *a* and *b*. Collected in St. John's; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, i, 328; Mér. and de L. Dict. de M. Méd. iii, 409; Ann. du Muséum, xiv, 464. It is one of the substitutes for colocynth. Mérat says: "Cette apocynée des États Unis passe pour fournir le suc avec lequel les sauvages de ce pays empoisonnent leurs flèches."

PLEURISY ROOT; BUTTERFLY-WEED, (*Asclepias tuberosa*, W. *Asclepias decumbens*, of some Bot.) Grows abundantly in pine barrens; collected in St. John's Berkeley; Newbern. Fl. July.

U. S. Disp. 127; Pe. Mat. Med. and Therap. ii, 347; Chap. Therap. and Mat. Med. i, 351; Ed. and Vav. Mat. Méd. 345; Eberle,

Mat. Med. ii, 219; Ell. Bot. Med. Notes, i, 326; Big. Am. Med. Bot. ii, 65; Thacher's U. S. Disp. Bart.; M. Bot. i, 244; Lind. Nat. Syst. Bot. 304; Am. Med. Record, iii, 334; Frost's Elems. Mat. Med. 217; Bell's Pract. Dict. 82; Cullen, Mat. Med. i, 6; Mér. and de L. Dict. de M. Méd. i, 467; De Cand. Prodromus, 458; Shec. Flora Carol. 220; Barton's Collec. 48; Lind. Nat. Syst. Bot. 304. This plant is actively diaphoretic and expectorant, without being stimulant. "It has the singular property of exciting general perspiration without increasing in any perceptible degree the heat of the body." (Lindley, see *A. decumbens.*) In large doses it is purgative. It has been advantageously used in rheumatism, in most pectoral affections, catarrh, subacute pneumonia, and in phthisis, as a palliative. It has also been favorably employed in dysentery. Shecut says that thirty grains of the powdered root at a dose was much esteemed in this disease. Dr. McBride, of St. John's, South Carolina, experimented largely with it in pleurisy, generally finding it to act with advantage. Eberle used it; and Dr. Parker employed it for twenty years with continued confidence. It is sometimes called wind root, on account of the relief it gives in flatulence. Dr. Pawling, of Pa., says that when freely given it diminishes the volume and activity of the pulse, while it produces copious diaphoresis. Am. J. Pharm. xxxiii, 496; U. S. Disp., 12th Ed. In a communication from Dr. John Douglass, of Chester District, South Carolina, we have the results of the experiments of Mr. McKeown, who believes it expectorant, tonic, diaphoretic and sudorific, and who has employed it with benefit in pectoral affections; he considers that a teaspoonful of the powdered root in hot water, often repeated, acts as a safe and useful substitute for the preparations of antimony; he has also observed that the same quantity of the root, with half the amount of snakeroot, (*Aristoloch serp.,*) given several times a day for several days, will induce soreness of the mouth, with free and copious salivation; this soon subsides, without any of those disagreeable results which follow the administration of the mercurial preparations. Should this effect be constant, it might be made of great service. A medical friend informs me that he employed the decoction in two cases of pneumonia, and that the action on the lungs was most decided and rapid. There seems to be no question as to its utility. It may act by disgorging the

portal system, besides increasing the excretion from the mucous membrane of the lungs. It should be more extensively employed by physicians. The powdered root has been used as an escharotic for restraining the growth of fungous flesh in ulcers. When the diaphoretic effect is desired the decoction of one ounce of the root to one quart of water is best, given in doses of a tea cupful every two hours. Dose of powdered root, twenty grains to one drachm several times a day.

In the neighborhood of Camden, South Carolina, the root of silk-weed (pleurisy root) is much relied on in rheumatism. The root is macerated in brandy. It is believed by many that it has a marked influence in promoting the excretion of bile, and the tincture is said by those who use it to have a laxative effect. It is used as a substitute for calomel. This testimony, recently obtained, will be found to correspond with what was written by me long since of the pleurisy root, (*A. tuberosa*,) in my Report on Med. Bot. S. C. 1849. A fluid extract has been made.

From a work reputed to contain the practice of physic among the Cherokee Indians, entitled the "Indian Guide to Health," I quote the following, which adds little to our previous knowledge: "Few articles in the Indian materia medica maintain a higher standing than pleurisy root. It acts as a mild purgative on the bowels, but it is more particularly and inestimably valuable in producing expectoration, or throwing off mucus from the throat and lungs, and in causing perspiration or sweating when other remedies fail. This root possesses one remarkable power—given in proper quantities it affects the skin and produces perspiration without heating the body or increasing circulation. It is a valuable article in diseases of the lungs generally. Its use in a strong decoction often gives relief to pain in the chest, stomach and intestines, by promoting perspiration and assisting digestion."

The milky juice exuding from *Asclepias*, *Leontodon*, *Lactuca* and the *Euphorbiaceæ* yield caoutchouc. I would suppose that the queen's delight, (*Stillingia*,) which is abundant, would also furnish it. It might be procured from those which give a large exudation of milk when cut. I have collected and dried the juice of *Asclepias*. "When any of these plants are incised there exudes a milky juice which by exposure to the air grad-

ually lets fall concrete caoutchouc. The juice is pale yellow, thick, and similar to cream. When spread in thin layers on a solid body it soon becomes solid caoutchouc, amounting to forty-five per cent. of the weight of juice. The black color is owing to the method of drying it after it has been spread upon moulds." Wilson's Rural Cyc., art. "Caoutchouc." Ure's Dict. of Arts contains full descriptions of processes, adaptability, etc. Caoutchouc is insoluble in water, alcohol, acids, or alkalies. By long boiling in water it softens and swells up. It is slightly soluble in ether.

The downy substance attached to the seed of the silk-weeds may be used for many purposes—for stuffing beds, cushions, etc.

Asclepias incarnata, W. "Grows in the valleys among the mountains of South Carolina," Elliott; vicinity of Charleston; Newbern. Fl. July.

U. S. Disp. 126; Journal Phil. Coll. Pharm. iv, 283; Griffith Med. Bot. 455. Dr. Griffith speaks of it as a useful emetic and cathartic; and Dr. Tully says it may be given advantageously in asthma, catarrh and syphilis; no doubt very similar in properties to the *A. decumbens*.

DWARF MILK-WEED, (*Asclepias verticillata*, L.) Collected in St. John's; Newbern.

This is a domestic remedy in repute for the bite of snakes. It is said by those who have used it in the upper districts of South Carolina to be very deservedly celebrated. See, also, Va. Med. J., December, 1858. These plants emit a milky juice when bruised; with the aigrette of the seeds, a fleecy down one or two inches in length, somewhat resembling silk, it has been proposed to make cloth. Upon experiment, 1863, I find the fibre of *A. obtusifolia* of Mx. uncommonly strong, and easily separated. A few strands resist every effort to break them, but they do not bear knotting well. They can be drawn from the plant and used as sewing thread without further preparation. The cohesion and tenacity of even the finest fibres is something extraordinary. Upon examining the fibre of the *A. variegata*, L., I find it if not stronger more easily separable.

VIRGINIAN SWALLOW-WORT; VIRGINIAN SILK, (*Asclepias cornuti*. Decaisne. *A. syriaca*, L.) Fields and roadsides; Newbern. Chap. and Croom's Cat.

The flowers are highly fragrant, especially in the morning and the evening, and "are gathered in their native country while the dew is on them, for the purpose of making *sugar*. The young shoots in spring are a very good substitute for asparagus; the down of the pods serves well for stuffing pillows and cushions, for making thread and cloth, and for some other purposes; the fibrous matter of the stems is abundant in quantity, excellent in flax-like quality, and is used and highly appreciated in some parts of North America for making thread, cordage, fishing nets and cloth. It has been successfully experimented with as an agricultural plant in France and Germany. It may be propagated either by transplanting roots in rows about two feet apart or by sowing seeds." Wilson's Rural Cyc. Many of the Silk-weeds have strong fibres. The above only confirms a note in Prof. Gibbes' "Catalogue" as follows: the cortical fibres of many possess great strength, as is easily proved by the attempt to break their stems. From those of the *A. syriaca* a number of articles have lately been manufactured at Salem, Mass.—such as thread, netting, bags and purses, tapes, socks, knotting for fringes, etc. The silk from the pods forms an excellent article for stuffing cushions, pillows, mattresses, etc. Mixed with cotton it may be spun into yarn for gloves and socks. It is used in making artificial feathers and flowers. Bonnets, capes and tippets of very handsome appearance are made by sewing the tufts in overlapping rows on cotton or silk. In Germany, in 1785, the cultivation of the *A. syriaca* was begun with six plants, and in eight years there was a plantation of thirty thousand, which yielded eight hundred pounds of silk the first crop, three hundred and fifty-five the second, and six hundred the third. In the same country a paper was made from the cortical fibres which was distinguished with difficulty from that made from rags. See Silliman's Jour., vol. xxviii, p. 380, and an article in the Horticultural Register, by Dearborn, in which he also gives an account of his mode of cultivation of the same plant for its young shoots, which he considers nearly equal to asparagus. *Loc. cit. sup.* From nearly all the species of Silk-weed the down from the seeds may be collected. They abound in almost every portion of the Southern States.

The Indian doctors use the root of the silk-weed as a diuretic

decoction in gonorrhœa. The root is said to be emetic and cathartic, and is used in dropsy. Dr. R. S. Cauthorn, of Richmond, Va., has given the powdered root in three grain doses with success in six cases of intermittent fever; Stethoscope, 1858. Dr. Richardson, of Mass., found the root possessed of anodyne properties, giving a drachm of the powdered root in divided doses, and employing a strong infusion in cases of asthma and catarrh. Dr. A. E. Thomas, of Miss., and Dr. McLean, of Ky., in letters to the editors of the U. S. Disp., speak of the success attending the employment of the root in scrofula, for which it has been long used. The latter found it useful as an alterative in hepatic affections, but was doubtful of the species. U. S. Disp., 12th Ed.

BASTARD IPECAC; BLOOD WEED; CURASOA, (*A. curassavica*, L.) Grows in South Florida, (Chap.;) is possessed of emetic and sudorific qualities, and by Dr. W. Hamilton is used in arresting hemorrhages. Dr. Barham found it very efficient in obstinate gonorrhœa. Am. J. Pharm. xix, 19.

OLEACEÆ. (*The Olive Tribe.*)

This order is said by Lindley to offer one of the few instances of oil being contained in the pericarp, it being in most other plants yielded by the seeds.

EUROPEAN OLIVE, (*Olea Europea.*) Introduced.

This well known plant, of which it has been said "*Olea prima omnium arborum est,*" is cultivated in Charleston as a garden plant, and matures its fruit. A tree in Lamboll street bears fruit of good size, which I have seen made into excellent "olives" for table use; also pickled. Repeated attempts have been made to cultivate the olive, and little doubt exists that with greater efforts it may become a valuable oil-bearing plant. In Patent Office Reports, 1854, p. 28, is a brief statement of several efforts to introduce the olive into South Carolina, Georgia, and other Southern States. A paper was also published on this subject by Judge M. King, of Charleston. In 1755 Mr. Henry Laurens imported and planted olives, capers, limes, ginger, etc. The latter is still easily raised in our gardens in South Carolina, Georgia and Florida. In 1785 the olive was successfully grown in South Carolina. It is not easily propagated from seeds. A colony of Greeks, settled at East Florida,

had planted the olive, and sixty years ago it is said there were large trees marking the site of that settlement. The tree was also cultivated by Mr. Cooper, of St. Simons, and Mr. Spalding, of Georgia. See a paper in Southern Cultivator, p. 7, vol. iii; also, Jefferson's letter to Drayton, in his Memoirs.

As this plant is an important one, and experience concerning its propagation in the Southern States is difficult to obtain, I add the following statement of Mr. R. Chisolm, Beaufort District, S. C.:

"My olive trees were imported from the neighborhood of Florence, by the way of Leghorn, in 1833, and consist of two kinds—the small, round, esteemed best for oil, and a much larger and more oval-fruited sort, which turns white before it becomes purple, the latter having been sent as stalks to engraft the other upon. The winter of 1834–5 was an excessively cold one, and injured to the roots all the orange trees of the South, and some of them so severely that they never afterward sprouted; yet I do not recollect that my olive trees suffered at all—certainly, none were killed. No cold which we have experienced since has caused them to shed a leaf, whereas our orange trees have suffered much, and about four years since barely escaped being killed to the ground. My olive trees are planted in a rather flat, clayey piece of land, quite near the salt water, and but little elevated above high tides. In Italy, I believe, it is generally thought that this tree does not thrive well far from the sea, but does best on what they call a fat soil, which contains more or less clay. From what I have seen of it on sandy soils in this vicinity it has proved not very fruitful. Finding that my trees grew very slowly, and not expecting to derive profit enough from them to pay for their culture, the idea occurred to me of trying to cultivate the sweet potato, field and cow-peas among them, hoping that the expense of cultivating the olive might be covered by these means. The land was well manured every year in June, and cultivated with one or the other of these crops, in such a manner as the other operations of the plantation would render convenient, generally, however, with sweet potatoes, irrespective of rotation. The result has much more than answered my expectations, as I very seldom failed to make a fair crop of potatoes, and the trees have grown vigorously, and rapidly come into bearing, and

have continued to bear good crops of fruit every year, occasionally abundant ones; while in Europe the habit of almost every variety of this tree is to bear only in alternate years. As the olive ripens during the months of October and November, at a time when we are straining every nerve to save most of our other crops, no attempt has been made to gather all the fruit; but one year enough was gathered, pounded in a mortar and the oil pressed out, to justify me in saying that I produced a very clear and good looking article, which was exhibited about two years since at the Fair at the South Carolina Institute. The only use that has yet been made of the olives is to pickle them while green, in a full grown state, in August or September, for which purpose they seem admirably adapted. A few may now be found on sale, which are preferred to those imported. The recipe for pickling was obtained from France, and is as follows: 'For each pound of the fruit take a pound of strong ashes (those of the hickory wood are the best we have) and an ounce of good slacked lime; mix the lime and ashes with water until a soft paste or mortar is formed, into which stir or imbed the olives, and finish by covering the whole mass with a layer of dry ashes. Let them lie in this state until all the bitumen is extracted, which may be known by the stones slipping readily out of the pulp when squeezed between the forefinger and thumb, for which purpose a few may be tried once an hour, or oftener if desired. The length of time required for this will depend entirely upon the quality of the ashes and lime, and may vary from two to three hours to as many days. As soon as the olives have been deprived of their bitterness they must be washed clean and put to soak in fresh water, which must be changed about once an hour for twenty-four hours, when the taste of potash will have been removed and the water cease to be discolored. The olives must then be put into bottles or jars, and a strong brine put over them made from good rock or alum salt. This brine will generally require to be changed several times, in consequence of becoming ash-colored, after which the bottles must be sealed air-tight, and if kept in a cool, dry, dark place, the olives will keep good for years.' Olives carefully cured after this plan will be found less salty than those pickled in France which are usually sold in this country, and will retain much of the nutty flavor of pure

olive oil. I do not think that the making of oil from the olive will be likely to prove sufficiently profitable to be pursued in this country for many years, as labor is expensive, and other crops will necessarily take the lead, unless the price of labor or soil in Europe should be increased, when there will, consequently, become a greater demand."

The oil is obtained of two or three qualities. The *virgin* oil is that which spontaneously separates from the paste of crushed olives. This is purified for watchmakers by placing in a vial containing in it a slip of sheet lead. In Sicily the olives are beaten from the tree. It is allowed to ferment in bins or receptacles. It is then conveyed to a mill, ground into a paste under heavy stones, and chaff or small straw occasionally thrown in to retain the oil. The pulp is then rammed into round, flat baskets, made of a strong kind of rush, and submitted to a press. When the oil ceases to run from a first pressing, the baskets are removed, their contents again pressed under the mill, returned to the baskets, submitted to the press again. Hot water is sometimes thrown over the mass to increase the flow of oil, the latter being subsequently skimmed from the surface. What is finally left in the baskets, after the third pressure, is refuse material, used for lamps by curriers and tanners. To procure the best oil no fermentation should be used. Consult Ure's Dictionary of Arts, Patent Office Reports, 1859, p. 114.

DEVIL-WOOD; AMERICAN OLIVE, (*Olea Americana.*) I have collected it near Charleston, Rutledge's farm and in St. John's, S. C. Rare and ornamental.

The wood has a fine and compact grain, and when perfectly dry it is excessively hard and very difficult to cut or split; hence is derived the name of devil-wood. On laying bare the cellular integuments of the bark its natural yellow hue changes instantaneously to a deep red, and the wood, by contact with the air, assumes a rosy complexion. I have not been able to verify this after repeated trials. Michaux suggests that experiments be made to test the nature of this active principle. Am. Sylva; Farmer's Encyc.

OLD-MAN'S BEARD; POISON ASH; FRINGE TREE, (*Chionanthus Virginica*, Walter.) A very ornamental plant; collected in the swamps of St. John's Berkeley; vicinity of Charleston; Newbern. Fl. April.

Ell. Bot. Med. Notes, i, 6. An infusion of the roots is given in long standing intermittents, It is tonic and febrifugal, with some acro-narcotic properties ; used in the form of cataplasm as an application to wounds and ulcers. Griffith Med. Bot. 44. I have been told that it is a useful diuretic, prescribed with sulphate of iron and spirits in dropsy. Gen. L. M. Ayer informs me that his father was in the habit of using the "white ash, or old man's beard, in the case of native born Africans who suffered from yaws or ulcers and sores, which were often rapidly fatal. The decoction given internally and used as a wash gave relief, when everything else failed. Mills, also, in his Statistics of S. C., states that the bark of the root bruised and applied to fresh wounds is accounted a specific in healing them without suppuration.

Fraxinus acuminata, La. M. Grows in rich swamps; St. John's; Newbern.

Ell. Bot. Med. Notes, ii, 673. The wood is light, elastic and strong; used by carriage and cabinet-makers and wheelwrights.

WHITE ASH, (*Fraxinus Americana*, L.)

In the Southern States we have the white, red, green, blue and water ash. Wilson says that *F. Americana* differs in few respects from the English ash, *F. excelsior*, which in England is used for every conceivable purpose by the farmer, turner, cabinet-maker, wheelwright, and for firewood. "The bark of the tree is used for tanning calfskins, and for dyeing green, blue and black; the ashes of the trunk, root or branches are comparatively rich in potash." Coal was also made from it. The leaves of the *F. Americana* "are said to be so highly offensive to the rattlesnake that that formidable reptile is never found on land where it grows; and it is the practice of hunters and others having occasion to traverse the woods in the summer months to stuff their boots or shoes with white ash leaves as a preventative of the bite of the rattlesnake."

Class II. GYMNOSPERMS.

CYCADACEÆ.

WILD COONTIE; TUCKAHOE, (*Zamia integrifolia.*) S. Fla.; Chap.

The large succulent, fleshy roots, when properly treated, yield a large quantity of arrowroot, equal to the best Bermuda. Carson in Pereira. The fruit has a coating of an orange-colored pulp, which Rafinesque states forms a rich edible food. Griffith. Japan sago is also obtained from a Cycas, the pith of which is very nourishing. See "Arrowroot," "Maranta."

CONIFERÆ OR PINACEÆ. (*The Fir Tribe.*)

One of the most important orders, whether we view it in reference to its timber or its secretions.

LONG-LEAVED PINE, (*Pinus palustris*, L. *Pinus australis*, Mich.) The specific name is a misnomer, as it grows on high land. Grows along the seacoast in the tertiary region, and within one hundred and twenty miles of the ocean. I have observed it in the lower part of Fairfield District; a strip of it is found in Powhattan County, Va.; Newbern. Fl. May.

Bell's Pract. Dict. 359; U. S. Disp. 709; Pe. Mat. Med. ii, 167; Ball, Gar. M. Med. 309; Royle, Mat. Med. 564. This is the most valuable of the pine trees, and from it the largest amount of tar, pitch and turpentine is obtained.

This tree shoots up into a straight shaft, devoid of branches sometimes for fifty or sixty feet; the heart is very durable, and the wood is employed for almost every purpose. It is, indeed, one of the great gifts of God to man, for it furnishes to every one an abundant material for fuel, fire, warmth and light.

The forests of pine are not only useful but beautiful. The characteristic moan of the winds through their branches, their funereal aspect, almost limitless extent, and the health-giving influences which attend their presence, all contribute to make the pine an object of peculiar interest to the people of the Southern States. The terebinthinate odor of the tree, some electrical influence of its long, spear-like leaves, a certain modification of "ozone," (an allotropic condition of oxygen, according to Faraday,) are severally esteemed to modify the atmos-

phere and diminish the effects of malaria. They also create a mechanical barrier to the ingress of malaria, and hence the pine land residences, though condemned for their sterile aspect, have proved a blessing to the Southern planters in affording a comparatively safe refuge from the unhealthy emanations of the neighboring plantations.

I need not describe the processes for making Tar. It is a very compound substance, (see Rural Cyc.,) and contains modified resin, oil of turpentine, empyreumatic oil, acetic acid, charcoal and water, and when inspissated by boiling is converted into pitch. It is extensively used in the cordage, caulking and sheathing of ships, to preserve them from the weather. It is of great service in many of the arts and medicinal usages connected with agriculture. I will add what Wilson states of its economical employment, as it may be made of great service on our plantations and in veterinary medicine. It serves well as a paint to coarse kinds of boarding and paling, but is improved in its use by the addition of tallow or other coarse fat. It is applied as a covering to cuts on animals, and to parts affected by the fly. It serves, either alone or in combination with some fatty substance, to defend the sore or diseased feet of cattle from being further injured by wet or abrasion; when spread upon coarse cloth it is a prime covering for broken horns, and makes an excellent application to various kinds of wounds and punctures in cattle. It is given internally to horses as a remedy for cough; also as a detergent and local remedy for scaly and eruptive diseases. Rural Cyc. It is used to cover the lower surface of posts to prevent their rotting, and grain soaked in it is not eaten by birds. Tar water was formerly much used in medicine, but at present wood naphtha and pyroligneous acid, etc., are commonly employed.

The buds of the pine or the inside barks steeped in water is a favorite domestic remedy on our plantations for colds and coughs. Bits of fat pine steeped in gin are also used. A decoction of the inside bark is given daily as a remedy in chronic diarrhœa. Pills of resin are often employed as a simple diuretic. Resin also enters into the composition of strengthening plasters.

Wilson, in his Rural Cyc., articles "Fuel" and "Charcoal," gives the best mode of preparation, including the quality and

yield of several trees. See *Salix*, in this volume, for manufacture of charcoal.

The chief consumption of charcoal is as fuel. It is also employed as a tooth powder and to purify tainted meat. No mode of preparation for the first of these objects is at all necessary, and for the two last it must merely be reduced to a fine powder. It forms a part of all reducing fluxes. It is the basis of most black paints and varnishes. It is used to polish brass and copper, and is an excellent clarifier. It is used in farriery, in combination with linseed meal, as an anti-septic cataplasm for foul and fetid ulcers. Powdered charcoal must be heated to redness in a covered crucible, with an opening in the middle of the cover, and kept in that state till no flame issues out; it must then be withdrawn, allowed to cool, and then put into close vessels. Whenever either wine, vinegar, or other fluid is to be clarified it is simply to be mixed with the liquor; a froth appears at the surface, and after filtration it is pure and colorless. Charcoal is also used as a valuable manure, fully described in Wilson's Rural Cyc. Charcoal and sand placed in the bottom of a barrel or hogshead will purify water passed through it. (See *Salix*.) It is generally believed that it will prevent contagion, yellow fever, etc., if taken during the prevalence of an epidemic. It is also used as a mild mechanical laxative in dyspepsia with foul stomach. See medical authors. Its power of absorbing gases and vapors is well known.

Lamp-black is obtained by the turpentine manufacturers "from the combustion of the refuse of their operations in furnaces appropriated to that purpose. The smoke deposits itself on the sacking which is hung up; it is swept off and sold for common use without further preparation. The lamp-black in this state contains some oil, which is separated by being heated to redness in a close vessel." This may be easily made in our large turpentine distilleries throughout the Southern States.

Creosote, also a product of the pine, is obtained from "crude pyroligneous acid and the heavy portion of the oil of wood tar, sometimes called the essence of tar, and used in the preservation of meat, the flavoring of hams, and as a remedial agent for its constringing effect." It coagulates albumen. Fresh meat suspended over creosote will be preserved. Wilson's Rural Cyc.; Ure's Dict.; and medical authors. Pyroligneous acid, ob-

tained from the pine, is used in preserving meat rapidly in lieu, of the slow process of "smoking." This acid, naphtha, creosote and other products of the distillation of wood, might be advantageously combined in the same process.

Vinegar and acetic acid, obtained from pyroligneous acid, is purified by converting it into acetate of soda and decomposing that salt by means of sulphuric acid. The acetic acid, after being distilled, is lowered by water, colored, and used as vinegar.

Since writing the above I find the following in the Norfolk Day Book, 1856:

J. A. Mattock, Esq., of Onslow County, N. C., has invented and patented a machine known as the "J. A. Mattock's Improved Apparatus for the distillation of pine wood." This valuable invention has been in successful operation, and is likely to come into general use in the piney regions of North Carolina. The machine runs out from a load of pine wood, seventy-five gallons of crude spirits of turpentine, which is clarified at a small expense, at a cost of less than twenty per cent. Besides this product of the machine's manipulation, fifty-four pounds of acid, after being purified, are produced, which is worth $1.50 per pound, or more. In addition, there are produced four barrels of pitch. The machine is capable of manipulating two cords of wood per day. There may be other material or residuum which may be put to some use and yield a profit.

It will be seen, therefore, that the machine can turn out daily the following articles of North Carolina staples:

120 gallons pure spirits at 72 cents per gallon	$86 40
108 pounds acid at $1 50 per pound	162 00
8 barrels pitch at $6 a $10	48 00

We are not informed as to the cost of the machine, nor of the expense of running it. Two cords of wood would cost here $3 50 to $4; and in North Carolina, upon the spot, about 50 a 75 cents. Here is an operation which would require small capital, and is a field for the idle or enterprising.

Machinery for the distillation and separation of all the products furnished by the pine is being erected, 1867, in South Carolina also. By the process fresh and dry pine wood are used, and turpentine, tar, charcoal, resin, pyroligneous and acetic acid, I believe, are procured.

The Wilmington, N. C., Dispatch, for February, 1867, states

that discoveries have been recently made in the distillation of resinous wood, which, tested by experiment, promise to work great changes in the manufacture of naval stores, etc., with the promise also of increased pecuniary results. We are not prepared to describe the *modus operandi* of this new process for distillation; but have been assured by parties who have engaged in it in the Counties of Cumberland and Robeson, that the process is a simple one, and the results highly satisfactory.

In New Jersey, this process has been lately introduced with the following results: From a single cord of pitch pine distilled by chemical apparatus, and by the processes employed, the following substances in the quantities stated are obtained:

Spirits Turpentine	20 gallons.
Illuminating Oil and Tar	50 gallons.
Pyroligneous Acid	100 gallons.
Wood Spirit	5 gallons.
Pitch or Rosin	1½ barrels.
Tar	1 barrel.
Illuminating Gas	about 6,000 cubic feet.
Charcoal	50 bushels.

These results are those derived from eight separate charges, aud are selected from many others, not as presenting the most favorable exhibits as regards quantities, (which they do not,) but as showing the value of the several kinds of wood and the best manner of working. There are works now in use in New Jersey capable of distilling five cords of wood per day, and the products, at present prices, will yield the following daily income:

100 gallons Spirits Turpentine at 85 cents per gallon	$85 00
250 gallons Illuminating Oil and Tar at 50 cents per gallon	125 00
500 gallons Pyroligneous Acid at 12 cents per gallon	60 00
25 gallons Wood Spirit at 20 cents per gallon	40 00
30,000 feet Illiuminating Gas at $1 60 per M	48 00
7½ barrels Pitch or Rosin at $5 per barrel	37 50
5 barrels Tar at $4 per barrel	20 00
250 bushels Charcoal at 25 cents per bushel	62 50
	$478 00
Cost of production and losses	$159 00
Leaving a balance of net profits per day	$319 00

The census of 1860 shows that the proportion of spirits of turpentine in the United States by ordinary process, for the year 1859, was equal to the production from 1,600 cords of wood distilled daily by this process.

The gas produced by this process, it is said, has great superiority over ordinary coal gas. It has no offensive odor, and is free from the sulphur present in coal gas. The charcoal, also, has great superiority, and though made from resinous wood, has as great specific gravity as that made from the harder woods.

Carbolic Acid, discovered by Runge in 1834 in the tar of coal, and known also as Phenic acid, Phenylic acid and Hydrated oxide of Phenyl, bears so close a resemblance to creosote from wood that the two have been considered identical. For this reason and on account of its application to numerous important purposes as a disinfectant, as a dressing to wounds, etc., I refer to it in this connection. In the 12th Ed. U. S. D., Dr. Wood states of it that "its aqueous solution coagulates albumen, arrests fermentation, instantly destroys the lowest forms of vegetable and animal life, and in very small proportions prevents moldiness in vegetable juices, and prevents animal substances from putrefaction." For the latter purpose the bisulphide of carbon is now being experimented with for the preservation of meat. C. acid has also what may prove to us a very important property first suggested by M. Lemaire, namely, "that of destroying miasms and even of modifying the action of malaria." I give prominence to this as I am possessed of statements from parties in South Carolina by which it appears that the vapor of a solution of carlolic acid, diffused in sleeping apartments, has apparently prevented the effects of malaria. It was used among the residents of a number of houses. I hope that this will be farther tested as there is great plausibility in the suggestion that it will be serviceable, assuming that malaria is taken into the system at night. It is also said to drive away mosquitos and "predatory" insects generally. I have employed it extensively in hospital practice, and regard its solution in glycerine, one part to four, as specially valuable as a disinfectant, particularly in uterine diseases with offensive discharges. As an application to wounds and as a dressing after amputation, etc., I prefer Labaraque's Sol. of Chloride of Soda. As an application to

mucus surfaces, the throat for example, the strength used is one to thirty or stronger. It may be combined with tinct. of iodine.

The Spirits or Oil of Turpentine obtained from this pine is now one of the most universally employed of remedial agents; it is quite surprising to how great a diversity of conditions it is applicable; all these depend, however, upon its natural properties. See Trousseau's "Therapeutique," Stillé's Mat. Med. and recent authors. As an external rubefacient, a diffusible stimulant, an astringent, a stimulating diuretic, anthelmintic and laxative, Turpentine admits of frequent applications.

In Confed. S. Med. J. Jan., 1864, is an article on the external application of oil of turpentine as a substitute for quinine in intermittent fever. Surg. Styles Kennedy had called the attention of the Medical Bureau to this method. A bandage wet with turpentine is applied around the body half an hour before the expected paroxysm. Surg. K. reports the successful trial of this in over thirty cases. It was also tried at the Gen. Hosp., Guyton, Ga., 1862. The applications should be repeated, particularly on the seventh and fourteenth days. See, also, an editorial notice in the number for Aug., 1864, where seventy returns are received involving a trial of this remedy in over four hundred cases. It is considered useful only as an adjuvant and not as a specific. In the arts, also, and as a material in the manufacture of soap, as a resin, and for the production of light, it is equally worthy of attention. The fumes of turpentine inhaled will cause irritability of the kidney if breathed. I have been called to attend several negroes with dysuria and bloody urine from sleeping aboard a boat laden with resin and turpentine in defective barrels.

Wilson says: "Turpentine is one of the best means of chasing away fleas whether from place or animal, and a bed of very fine shavings of some wood which abounds in turpentine is one of the easiest and most effectual means of banishing them from dogs, and that the oil of turpentine is almost a specific for spasm in the bowels." Rural Cyc. See, also, "*Juglans.*"

That variety of long-leaved pine which acquires a reddish hue frow growing in certain soils, and is known by the name of red pine, is most esteemed, and in the opinion of some shipwrights is as solid and durable on the sides of vessels as the

white oak, but is said to form less perfect joints at stem and stern. It is also in great request at the North for flooring boards. The long-leaved pine supplies what is known as *naval stores* both to the United States and Europe. Rural Cyc.

Pyroligneous acid, obtained from the pine, is used in preserving meat rapidly in lieu of the slow process of "smoking."

A preparation with rosin, to preserve leather and shoes, is recommended by Col. Macerone, in the Mechanic's Magazine, 1848. It will be found useful to soldiers on the march, and others who are exposed to the weather:

A pound of tallow and a half pound of rosin are put in a vessel on the fire, and when melted and mixed it is applied while hot, with a brush, to the leather previously warmed. This must be done thoroughly and repeatedly. If it is desired that the leather should receive polish, dissolve an ounce of beeswax with an ounce of turpentine, to which add a teaspoonful of lamp-black; a day or two after the leather has been treated with the tallow and rosin rub over it the wax and turpentine, but not before the fire. Tallow or any other grease becomes rancid and rots the stitching as well as the leather, but the rosin gives it an anti-septic quality which preserves the whole. Boots or shoes for the soldier, as well as for all who go much in the wet, should be so large as to admit of wearing in them cork soles—cork being a bad conductor of heat.

Turpentine and rosin are both abundant within our limits. An excellent English "*mixture to render leather water-proof*" is made with turpentine. During the scarcity of leather and exposure of our soldiers, I thought its introduction not inappropriate. It is used by the punt-shooters in the fenny parts of England: melt together in an earthen pipkin half a pound of tallow, four ounces of hog's lard, two ounces of turpentine and as much beeswax; make the boots thoroughly dry and warm, and rub in the mixture well with a little tow as hot as the hand can bear, or else hold the leather over a very gentle fire till it has thoroughly imbibed the mixture. Another mixture for the same purpose, and used by fishermen, soldiers and others, is made thus: Burgundy pitch (rosin?) and turpentine each two ounces, tallow four ounces; or half a pound of beeswax, a quarter of a pound of rosin, and a quarter of a pound of beef suet. The leather must be dry and the mixture warm. Oil of lavender also prevents leather from moulding.

To make Cloth water-proof with Turpentine.—In making cloth water-proof for negroes for picking cotton when the weed is wet from rains or dews, and also for tents, the following method is adopted: "To every gallon of spirits of turpentine put two and a half pounds of beeswax, boil well in a pot, remove the fire, and while it is hot put in the goods; move it about until it is well saturated, then hang it up to dry. It will require one gallon of turpentine to every eight yards of goods." It is more pliant than India-rubber.

Candles for war times made with Rosin.—"A model economical candle, sixty yards long, for use of soldiers in camp, which will burn six hours each night for six months, and all that light at a cost of a few cents, is made as follows: Take one pound of beeswax, and three-fourths of a pound of rosin, melt them together, then take about four threads of slack-twisted cotton for a wick, and draw it about three times through the melted wax and rosin, and wind it in a ball; pull the end and you have a good candle." Coarse cotton threads, sixteen to twenty inches in length, dipped in melted rosin, and when dry supported in a vessel of sand or earth, were largely employed during the war as an economical substitute for candles. I have made great numbers of them.

A preparation of turpentine, probably turpentine redistilled, called *Terebene*, was manufactured at Camden, South Carolina, and largely used as a burning fluid since the blockade. The price is moderate; it gives a good light, but requires a modification of the old kerosene chimney. "Palmetto oil," so-called, is probably pure turpentine. Prof. F. A. Porcher used and recommended turpentine during the war, and I have known others who have employed it for months as a burning fluid; it is not explosive. In using these highly carbonaceous agents an abundance of air must be admitted to the wick to consume the excess of carbon, which would otherwise be thrown off as smoke or deposited as lamp-black; an extra amount of oxygen is of course required to increase the combustion. I have used turpentine purchased at a distiliery in an ordinary terebene lamp with a burner of an inch in diameter. The light was as good as that afforded by palmetto oil or terebene, giving no trouble. *Lamp-black* is prepared from the imperfect destruction of turpentine in large burners with suitable apparatus to collect it; it may be made in the Southern States with profit.

An economical "*Soap without grease*" is made with rosin: to four gallons of strong lye add ten pounds of distilled rosin, or eight pounds of pure gum not distilled and free from trash, boil steadily until there is no rosin to be seen, and if the quantity of lye is not sufficient add more, and continue to add until the rosin disappears, boiling until it makes a brown jelly soap. This soap has been extensively made in South Carolina during the past year, (1862,) and is stated to be "equal to the best soap made with grease." I am induced to insert here the following, also, which has been successfully repeated in the country parishes of South Carolina since the blockade: *Tallow candles equal to sperm.*—To two pounds of tallow add one tea cupful of good strong lye from wood ashes. Let it simmer over a slow fire, when a greasy scum collects on the top, which should be skimmed off and used in making soap, with which it is closely related. A pure tallow candle with a small wick may then be moulded, which is said to equal sperm candles. A little of the juice of the prickly pear or beeswax will render the tallow harder, and the wicks steeped in a little spirits of turpentine will make them burn brighter.

The following preparation of *coal tar* I append on account of its utility in camps and hospitals. Pyroligneous acid is itself a well known disinfectant:

Anti-septic Powder.—To correct the offensive odors of wounds, mix one hundred parts of calcined plaster of Paris and two parts of coal tar. Rub well together. Sprinkle this upon the wound once or twice daily. This has been fully tested for years in the Bellevue hospital.

Decoction of the leaves of the pine tree sweetened, to be freely drunk warm when going to bed at night or cold during the day, is very much used as a domestic remedy for colds and coughs. The holly root (*Ilex opaca*) chewed, and a tea made of the blade of the Indian corn, are also given for colds; the latter also in intermittent fevers, it is said, with much success.

Duration of wood impregnated with sulphate of copper.—A paper upon this subject, translated from the bulletin of the Horticultural Society of the Seine, is published in the Farmer and Planter, p. 306, October, 1861. It is impregnated with sulphate of copper by M. Boucherie's process, which consists in causing a solution of the sulphate of copper to penetrate to the interior

of freshly cut woods, which preserves them indefinitely from decay. All woods do not permit penetration equally. "The beech, elm and fir readily admit all kinds of salts into their tissue. The oak impregnates completely its sap wood, while the heart of the tree absorbs absolutely nothing," so that that part of the tree which was thrown away may with this process be made useful. Sulphate of copper was found to be superior to corrosive sublimate. "The process of the injection of wood with the salts of copper is as simple as easy. For those woods intended for rods, it consists in plunging the base of a branch furnished with leaves into a tub containing the solution. The liquid ascends into the branches by the action of the leaves, and the wood is impregnated with the preservative salt. As for logs, the operation consists in cutting down the tree to be operated upon; fixing at its base a plank which is fixed by means of a screw placed in the centre, and which can be tightened at will when placed in the centre of the tree. This plank has on the side to be applied to the bottom of the tree a rather thick shield of leather, cloth, pasteboard, or some other substance, intended to establish a space between it and the wood, sufficient for the preserving fluid to keep in contact with the freshly cut surface of the tree. The liquid is brought there from a tub or other reservoir by the help of a slanting pole made on the upper side of the tree, and in which is put a tube adapted at its other extremity to a spigot in the upper reservoir, which contains the solution. A pressure of five metres suffices, so that the instant the sap of the tree is drawn away it escapes and is replaced by the liquid saturated with sulphate of copper. As soon as the operation terminates, and it lasts for some hours for the most difficult logs, the wood can be sold and put to any use." M. Decaisne enumerates the immense advantage which this process would procure to horticulture. Boxes, frames, greenhouses, supports, etc., submitted to the deleterious action of all the exterior agents which destroy them so rapidly, all can acquire an almost indefinite duration, and thus furnish a very great economy of time and money. M. Decaisne opposes the process by simple immersion. M. Audry asserts that even cloths, curtains, etc., exposed to the weather, "last eight years after being immersed in a solution of one kilogramme of the salt to eight litres of water." See "Kyan," Rural Cyc., for mode of preser-

vation of timber; also Boussingault's Rural Econ. and Agricult. Chemistry.

A very good composition for preserving wood which is to be placed in the ground, and subjected to rapid decay, is made with coal tar, quick lime and ground charcoal. The tar is first heated in an iron vessel; then about a pound each of quick lime and charcoal to every five gallons, stirred among it until the whole has become thoroughly mixed. It is applied hot with a brush, or the wood may be dipped into it. This preparation resists the attacks of insects.

To economize manures, etc., during non-importation of guano: "Weeds, leaves of trees, and all the succulent plants which grow so abundantly in ditches and waste lands, under hedges and by the roadside, if cut or pulled when in flower, and slightly fermented, furnish from twenty to twenty-five times more manure than straw does. These plants, carefully collected, furnish to the agriculturist an immense resource for enriching his lands. Besides the advantages arising from the manure furnished by these plants, the agriculturist will find his account in preventing the dissemination of their seeds, which, by propagating in the fields, deprive the crops of the nourishment of the soil. The turf that borders fields and highways may be made to answer the same purpose by cutting it up with all the roots and the earth adhering to them, rotting the whole in a heap and carrying the mass upon the field; or, what is still better, by burning it and dressing the land with the product of the combustion." The alkaline salts are most abundant, it will be remembered, in green, herbaceous plants. M. DeSaussure has observed that the ashes of young plants that grew upon a poor soil contained at least three-fourths of their weight of alkaline salts, and that those of leaves of trees which grew from their beds contained at least one-half. The ashes of the seeds contain a greater proportion of alkaline salts than those of the plants that produced them. M. Pertuis found that the trunks of trees afford less ashes than the branches. Chaptal's Chemistry, p. 97. The scrub oak (*V. catesbæi*) is said to yield ashes very rich in potash. A curious suggestion has been recently made to the writer, namely, to compress pine leaves by machinery where it exists so abundantly, and employ it as a combustible substance like peat.

The seeds of the long leaf pine are edible and nutritious, and are largely consumed by hogs—the roots likewise.

PITCH PINE, (*Pinus rigida*, L.) Vicinity of Charleston.

U. S. Disp. 207. From the *P. palustris* and from this species tar is extracted, which contains two principles valuable in medicine, viz: *picromar* and *creosote*. It is used in chronic cough and bronchial inflammation. Tar water had great reputation at one time, and is really not devoid of some value. The vapor also is employed in bronchial diseases, and the ointment in tinea capitis and psoriasis. The resin from these species is frequently made into pills, and taken for colds by those residing in the country—among whom, also, it is frequently employed with success in chronic blennorrhagia. A medical friend informs me that in one individual who took the pine gum in large quantities it produced an irritation of the urethral mucous membrane, similar to that resulting from the use of the spirit when improperly given.

BLACK SPRUCE; FIR, (*Pinus nigra*, Aiton.) Confined to the high ridges of the Alleghany Mountains. Fl. May.

U. S. Disp. 710; Ell. Bot. ii, 641. From this species the essential oil of spruce is obtained; prepared by boiling the young branches and evaporating the decoction; it has a bitterish, astringent, acidulous taste. The tall, slender bodies of this tree are used for the spars of vessels.

WHITE OR WEYMOUTH PINE; NORTHERN PINE, (*Pinus strobus*, L.) Found in the declivities of the mountains of the Carolinas, in the dark, sphagnous swamps along rivulets. Fl. May.

The wood is soft, fine grained and light, and free from turpentine. It is used for the inner work of houses, for boxes, cabinets, etc. "Preferred for the masts of vessels to all other wood."

The wood has little strength, gives a feeble hold to nails, and is liable to swell from humidity in the atmosphere; but, on the other hand, it is soft, light, easily wrought. In ornamental work and carving of every description the white pine is used; in fact, wherever a light wood is required. Masts are also made of it, and are exported to Liverpool, though not fully equal to those from Riga. The bowsprits and spars are made of white pine. Rural Cyc. In Eaton's Botany, a work published at the

North, it is stated that "perhaps nine-tenths of the boards used in America are of this species." This, however, is incorrect, as a large quantity of timber is obtained from our long-leaved pine.

WALTER'S PINE; SPRUCE PINE, (*Pinus glabra.*) St. John's, S. C.; Bull's place, Ashley River; (H. W. R.) Not unfrequent in Furgusson's swamp, near Santee Canal.

It is comparatively light and soft, and might serve as a substitute for northern pine, so much in demand for the manufacture of the inner work of houses, cabinets, presses, cases, etc., and particularly as a light material for boxes for the transportation of merchandise. The loblolly pine (*P. tæda*) is also useful for making tables, presses, etc., containing little turpentine. A decoction of the inner bark of the spruce pine acts on the skin, and is used in rheumatism, coughs, colds, etc. It is also employed as a fomentation in swellings and sprains. *Pinus inops*, which I collected at Reidville, Spartanburg, S. C., resembles somewhat our lower country spruce, and is sometimes so called. It never attains the same height.

Pinus tæda, L. Abundant along the seacoast; collected in St. John's; grows in Georgia; Newbern. Fl. April.

Pe. Mat. Med. ii, 161; U. S. Disp. 709. This also yields turpentine. Frankincense is said to be got from this species. The inner bark of the short-leaved pine will dye cotton goods a brown color without the aid of copperas. After boiling in the solution dip in strong lye. See, also, "Sumach" and "Hickory."

AMERICAN SILVER FIR, OR BALM OF GILEAD TREE, (*Abies balsamea*, *Abies balsamifera*, Mich. *Pinus balsamea*, Willd.) Grows on the summits of the mountains of Va. and the Carolinas. Fl. April.

Griffith Med. Bot. 605; U. S. Disp. 710. From this elegant species the Canada balsam is obtained; receiving this name, though containing no benzoic acid. Mér. and de L. Dict. de M. Méd. v. It is used as an external application to wounds.

HEMLOCK SPRUCE, (*Abies Canadensis*, *Pinus*, Linn.) Confined to the highest mountains.

Ell. Bot. ii, 641. The bark is valuable for tanning, though inferior to that of the oak. It affords the "hemlock, gum, or pitch."

BLACK SPRUCE, (*Abies nigra*, Poir.) High mountains of North Carolina and northward.

The tops of its branches yield the best kinds of *essence of spruce* for the manufacture of spruce beer. Its young stems and the upper parts of its old stems are light, strong and elastic, and are much used in America for the spars and topmasts of ships. Its large roots and the lower parts of its old stems are sometimes employed as substitutes for oak in making the knees and other bent parts of ships. Its timbers are exported to the West India Islands and to Britain for making packing boxes, herring barrels and other similar articles. Its resin is comparatively scarce and poor, and does not suffice for yielding turpentine or fine pitch. Wilson's R. Cyc.

WHITE SPRUCE, (*Abies alba*, Mx.) High mountains of North Carolina and northward.

The root fibres are macerated, stripped, and made into cordage by the North American Indians. Wilson's R. Cyc.

FLORIDA YEW, (*Taxus Floridana*, Nutt.) Apalachicola River, Middle Fla. Chap.

This tree should be examined for a resinous substance in the leaves, which may be poisonous, and to see if they will diminish the circulation, a property ascribed to the *T. baccata*. Wood durable.

AMERICAN ARBOR VITÆ, (*Thuja occidentalis*, L.) Confined to the mountain districts, along streams. Fl. May.

U. S. Disp. 1301; Griffith Med. Bot. 609. The leaves and twigs have a balsamic odor; the decoction was used in intermittent fevers, and, according to Schœpf, in cough, scurvy and rheumatism; Boerhaave employed the distilled water in dropsy. The leaves are said to form an excellent irritating ointment, which has proved useful in rheumatism, and the oil has been given with success as a vermifuge. Dr. J. R. Leaming, of N. Y., (U. S. Disp., 12th Ed., from N. Y. Journ. Med. N. S. xiv, 406, and Nov., 1856, p. 395,) has employed a tincture of the leaves internally with supposed advantage in affections believed to be cancerous; and the same remedy has been used locally with prompt effect in venereal excrescences. Dr. Benedict has found a saturated tincture useful as an emmenagogue, given in the dose of a teaspoonful three times a day. The wood is said by Michaux to be the most durable which our forests pro-

duce; fences for enclosures, rail posts, etc., are made of it. Said to be indigenous and to grow abundantly on the banks of the Hudson; "rocky banks on mountains of Carolina." Chapman. Prof. L. R. Gibbes expresses to me his doubts of its being found in the mountains of Carolina.

"It makes the finest ornamental hedge known to the climate. It requires pruning every year, attains any required height, and is very compact and beautiful." A writer, B. F. Maurice, of King's County, N. Y., (in Patent Office Reports, 1855, p. 316, see papers on "live fences,") states that he has hedges from two to fourteen years growth, from one to ten feet high, that will compare favorably with any in this country or in England. It is easily and readily cultivated by layers. If the hedge is for ornament, considerable care is required in trimming. A hedge should be pruned every year. "See, also, "Wild orange," (*Cerasus Caroliniana*,) in this volume. The arbor vitæ, when it can be grown large enough, as in Canada, furnishes one of the hardest and most durable of woods, adapted to all the purposes of the turner and machinist, for the construction of posts, fences, etc. "Fences made of it last three or four times longer than those constructed of any other wood. Wilson. The leaves are employed like the savin (*Juniperus*) in making a stimulating ointment. If the grain is close and compact it may be found to suit the purposes of the wood engraver. See "*Amelanchier*" for wood for engraving. In Canada, the thin, narrow pieces of wood which form both the ribs and the bottom of the bark boats are taken from this wood, because it is pliant enough for the purpose when fresh, and also because it is very light. The wood is considered one of the best for the use of lime-kilns. Its branches are used in Canada for brooms, which leave their peculiar scent in all the houses where they are used. Farmer's Encyc.

BALD CYPRESS, (*Taxodium dietichum*, Rich. *Cupressus disticha*, L. and Ell. Sk.) Grows in swamps in the lower portion of South Carolina and Georgia.

Mér. and de L. Dict. de M. Méd. Supplem. 229, 652; see the Cultivateur, ii, 668, for an article upon the cypress. Recherches sur l'histoire du Cyprès, Ann. de Hortic. xv, 37; Strauss, Mém. sur le Cyprès, Montpellier, 1841; Mirbel, Abridg. des Voyages, xiii, 396; S. T. Cubieres Mem. on the Cypress of Louisiana, (in

French,) Paris, 1809. This remarkable tree, lifting its giant form above the others, gives a striking feature to our swamps. They seem like watch-towers for the feathered race.

For a description see Michaux, N. Am. Sylva, Shec. Flora Carol. 484. The seeds are said to possess an odoriferous principle; a rich balsam of a deep red, inclining to black, is obtained by boxing the tree, and from the nuts and fruit by distillation. It is applied to cuts and wounds, and is possessed of valuable balsamic properties; the cones are also balsamic, and the resin from them is diuretic and carminative. This is undoubtedly one of the most valuable timber trees that we possess. The wood is soft, and rather fine grained, resisting the action of weather and the changes of temperature remarkably well; hence used for making the interior work of houses, posts, shingles, staves, etc. Barton mentions that boats from eight to twelve feet diameter and eighty feet straight shaft are made out of a single trunk. See, also, Ell. Bot. for a description; and also an elaborate paper in the April number of the Am. Journal of Science for 1848, by Drs. Dickeson and Brown, a committee from Louisiana, appointed by the Association of Geologists and Naturalists. Cypress leaves boiled during several hours afford a fine, durable, cinnamon color. The tree should be felled in winter. Woodsmen in cutting cypress in our river swamps recognize two varieties, the black which does not float in water and the white which is easily transported on account of its greater lightness The grain also differs.

WHITE CEDAR, (*Cupressus thyoides*, L.) Said to grow around the savannas in Horry and Williamsburg Districts; Newbern.

Ell. Bot. ii, 644; Griffith Med. Bot. 610. The infusion is reputed to be stomachic, and in the warm state diaphoretic. The wood is soft, fine grained, light and durable, and is adapted for purposes similar to the above. The young trees are easily handled and transported, and are particularly suited for telegraph poles. Shingles from this, sometimes called juniper shingles, last for forty years.

CEDAR, (*Juniperus Virginiana*, Linn.) Grows in upper and lower districts; Newbern. Fl. March.

Big. Am. Med. Bot. iii, 49; Pe. Mat. Med. ii, 184; Fr. Elems. 195; U. S. Disp. 413; Mér. and de L. Dict. de M. Med. iii, 698;

Mich. N. Am. Sylva, iii, 221; Am. Journal Pharm. xiv, 235; Thacher's Disp. 247; Lind. Nat. Syst. Bot. 316; Griffith Med. Bot. 607; Supplem. to the Dict. de M. Méd. 1846, 406; Bull. de l'Acad. Roy. de Méd. vi, 478; S. Cubieres' Mem. on the Red Cedar of Virginia, in French, Paris, 1805; Nicolet's Essai on the Physiol. and Chemistry of genus Juniperus; see Journal de Pharm. xxvii, 309, and Bonastie's note on a volatile oil from the Virginia cedar, in Journal de Pharm. xxi, 177, 1834.

The bark is employed in Abyssinia, under the name of *Bisenna.* The expressed oil is very useful as an application to rheumatic pains and swellings of the joints. One bushel of the dried shavings, heated in an inverted iron vessel, will yield a half pint of oil. A decoction of the berries promotes diaphoresis, and is also beneficial in rheumatic pains, stiff joints, etc. The leaves act very much as savin, being stimulant and emmenagogue, and are employed in catamenial obstructions.

The cedar berry is used in a popular remedy for dropsy, which is claimed by some to be highly efficacious. We can readily understand the reason that it may prove useful when we remember its close alliance with the juniper berry. It is as follows: take one handful of the seed of the cedar, the same of mullein, the same of the root of dogwood; put into two quarts and a pint of water, boil down to one quart, and add one gill of whiskey. Dose, a wineglassful night and morning. A cerate is made for keeping up the irritation and discharge from blisters; this is quite serviceable, and is prepared by boiling the fresh leaves in twice their weight of lard, with the addition of a little wax. The fungoid excrescences on this tree are thought to be anthelmintic.

The wood of the tree is well known. It is sometimes dug up in the mud of our swamps in a perfect state of preservation. It is aromatic, light, soft, bearing exposure to water and weather, and suitable for all kinds of cabinet work, in the construction of posts, staves, buckets, the inner work of houses, and particularly in the building of boats. Cedar boxes are not infested by insects, moths, etc., and are used for storing away woollens. The leaves also prevent the attacks of insects when spread over cloth. The roots make a beautiful purple dye.

Class III. ENDOGENS, OR MONOCOTYLEDONS.

MARANTACEÆ. (*The Arrowroot Tribe.*)

BERMUDA ARROWROOT, (*Maranta Arundinacea.*) Cultivated at the South for domestic use.

U. S. Disp. 449; Royle, Mat. Med. 585; Bell's Pract. Dict. 48. See authors. The root is grated, washed, and then dried in the sun on flat dishes. I have seen arrowroot flower beautifully prepared by ladies, who employ it for dietetic purposes, and also for starching muslins.

In a report to the Patent Office by Robert Gamble, of Florida, published in volume of 1851, p. 326, he says:

"The Bermuda arrowroot flourishes throughout South Florida, producing even in the pine lands, from 200 to 300 bushels to the acre, the quantity being largely increased when planted on rich lands. The yield of merchantable arrowroot flour obtained by very imperfect mills is from six to eight pounds to the bushel—worth from 25 to 30 cents per pound. Along our Atlantic coast south of 27° the *Cumpti*, or Indian arrowroot, grows spontaneously, giving results nearly equal to that of Bermuda, with the advantage that it requires no cultivation. The sole labor consists in bringing it from the forest lands and conveying it to the mill, the simple stirring occasioned by the digging being sufficient to secure a better crop than the one just removed. The Sisal hemp grows readily and luxuriantly, even upon our pine lands, and will eventually become a valuable staple; but in the multitude of others it is at present overlooked. So, also, the Palma Christi, which becomes a tree, and is perennial." See "Jerusalem Artichoke" (*Cynara*) and "Potato," (*Convolvulus*), for substances yielding starch. P. O. Reports on Agriculture, p. 324, 1858, contain a condensation of a report before the Am. Pharm. Assoc. by R. M. Batty, of Rome, Ga., on the "Production and Manufacture of Arrowroot in the South," with an account of the apparatus used in rasping. It is made a staple crop by one or two gentlemen near St. Mary's, and 2,900 pounds of Georgia arrowroot was sold in Savannah in one year. It can be raised by any farmer or planter. "Costing no actual money expended, the consumption of it as a dietetic article is unrestrained, and it supplies the place in

great measure of corn starch, farina, Irish moss, gelatine, and even rice and flour, in the preparation of delicacies for the table as well as the invalid's chamber." The yield of roots of all sizes to the acre is about 150 bushels. Col. Hallows, St. Mary's, Ga., has gone largely into the field culture, and has erected extensive buildings and machinery. Another species of plant grows wild also in South Florida, from which Florida arrowroot is made. It is called *Coonti*, and is described in the New Am. Enc. as a species of sago palm, (*Zamia integrifolia.*) See Florida arrowroot, *Zamia*, in this volume. A fecula was formerly prepared and used by the Florida Indians from the *Chamærops serrulata*, or saw palmetto.

The cultivation of the arrowroot is precisely that of the sweet potato. A rich, fresh, sandy soil, a large, full bed, the seed (roots) placed six inches deep and a foot apart, careful hoeing and keeping the bed up, constitute the culture. The seed roots should be planted as soon as the spring is confirmed—with us about the middle of March. The smaller tubers or roots are to be selected for seed, and are best preserved by placing ten to fifteen bushels in a conical heap, stacking closely around them a layer of corn-stalks, and placing over the whole a coating of two or three inches of earth. The object is to keep up a uniform temperature, and to avoid dampness and the extremes of heat and cold. The plants are allowed to grow until the leaves and stems are slightly affected by the frost; the roots are then to be dug as potatoes, the larger selected for manufacture and the smaller for seed. Those intended for manufacture are to be stacked in heaps of twenty to twenty-five bushels in the same way as directed for the seed roots. They must be carefully protected from the cold, as the fecula is changed by freezing.

The following is the mode of manufacturing for family use: The roots are washed, the scales on the outside removed by hand with a knife, and then again washed and placed in a tub of pure water. The next operation is to rasp down the roots by pressing them endwise against the circumference of the rasping machine. (P. O. Reports, 1858, see plate vi.) This machine consists of two wooden discs, framed as large pulleys, about three and a half feet in diameter, placed six inches apart and covered with strong tinned iron, punched from within like a coarse nutmeg grater. It revolves around a central axis of

wood with as great a velocity as can be given without throwing off the water from its circumference. A large trough is placed under the wheel, which is kept nearly full of water, the wheel dipping into the trough about six inches. As the wheel revolves the grated pulp is washed off into the trough, and when it becomes too thick the mass is passed into a large tub and the trough refilled with fresh water. The pulp collected in the tub is then pressed by hand until the fecula is separated from the fibre, and after removing the latter the fecula is allowed to settle to the bottom. The next and most important operation is to pour off the water from the sediment, and when the latter has become pretty firm, to break it carefully into cakes and with a large knife blade to remove from the bottom all sand and other impurities. The cleansed portion is then to be resuspended in a tub of pure water, allowed again to settle, again dried and cleansed. This operation must be repeated until the fecula settles in a perfectly white and clean cake. On the careful performance of this part of the manufacture depends the excellence of the article. The cakes are next to be broken up and placed upon cotton cloth stretchers until thoroughly dry and pulverulent, when the powder should be firmly packed in boxes or barrels. Air-drying in the shade is preferable to sun-drying, and dust must be sedulously avoided. Whatever the scale of manufacture and the machinery used, the essential points are: 1st, maturity of the roots; 2d, cleansing the roots before rasping; 3d, rasping so as completely to separate the fecula from the fibre; 4th, separating the fecula from sand and all other impurities by frequent agitation and subsidence; 5th, thorough and careful drying to avoid mustiness or mildew; 6th, packing so as effectually to exclude the air.

The principle of separating fecula being the same, any labor-saving machinery adapted to the manufacture of potato starch may be applied to arrowroot. On a large scale there would be great economy in driving several rasping machines by an engine, agitating the feculent mass from the rasper in large vats, filtering through cloths, drying by hot air in large buildings furnished with cloth stretchers, etc. Tinned iron is used for the rasping part of the mill, and wooden vessels for washing and precipitation. The reader will consult the article cited for the best mode of cultivation.

The writer quotes from Mr. Hamilton Cooper or Col. Hallowes, I believe, as follows: "There is no secret in making arrowroot. The great requisition, after the roots have been well washed and reduced to a fine pulp, is an abundance of water together with great cleanliness, and until the hands are well trained, the constant vigilance of the master. The latter is more or less necessary at all times. The pulp is passed at one operation through three sets of sieves of different degrees of fineness, put into motion by machinery, and using an abundance of water. As it is strained the fluid runs into vats, where it is allowed to settle, the water drawn off and fresh water added, stirring up the sediment thoroughly. This process is repeated a second time, and it is then strained through sieves of the finest bolting cloth, again washed with successive portions of water, allowed to settle in tubs, water decanted, and the tubs removed to the drying-house, where the fecula, when settled into a solid mass, is broken up and placed on frames of convenient size, covered with cotton shirting, which are carried into the drying-room, heated artificially, and allowed to remain eighteen to twenty-four hours, taken out, allowed to cool, and put into bins ready for packing. I use boxes containing about one hundred pounds each. In the course of the process of the manufacture I have attempted to describe, three thousand gallons of water are used daily, all of which is furnished by a well of the purest water, not exceeding twelve feet in depth. The use of tank water, it is thought, may be the cause of the pearly appearance of Bermuda arrowroot, or the greater maturity of the plant. Ure says it requires eleven months to mature in the Island of St. Vincent." What is called Portland sago is made from the *Arum maculatum;* we have two species in the Southern States. See "*Arum*," in this volume.

I have seen the plant cultivated and the arrowroot prepared on the plantations in St. John's Berkeley, S. C. The great value of arrowroot as an article of food for the sick and convalescent, and its consequent great utility to armies in the field, make it particularly desirable that its culture should be extended. I therefore introduce the following directions by the late Governor Seabrook of South Carolina. The method of culture is simple, and is as follows: upon a piece of ground moder-

ately high, and of a loose soil, make small beds three feet asunder, and at the distance of every two feet drop one seed, which should be covered about two inches deep. The middle of March is the proper season for planting, and no care or attention is subsequently required but to keep the plants free from grass and weeds. After the first frost they should be dug, and when you have selected the seed it is necessary for their preservation that they should be buried at least one foot in some dry and warm spot. The preparation of the root for food is tedious, and in consequence of the toughness of the outer coat it would be advisable to perform the operation as speedily as possible after digging. As soon as this is effected, grate the roots in a clean vessel of water, then pass the contents thereof through a sieve; this must be repeated, taking care to change the water at every successive operation so long as any coarse particles remain in the sieve. The water is then allowed to settle, and if it exhibits a clear and natural appearance the sediment is in a fit state to be dried, which should be done, if possible, in the sun, and in a confined situation, where no dust can reach it. To a tablespoonful thus prepared pour on a pint of boiling water, stirring it at the same time briskly, to which add a little sugar and nutmeg, and you will then have a jelly as pleasant as it is healthful. Boiled with milk it is excellent.

When Starch is obtained from any other plant than one of the grains, as from potatoes, corn, flag, bryony, horse-chestnut, wild orchis, dogbane, burdock, iris, henbane, patience, ranunculus, etc., it is known by the name of fecula. Chaptal describes two processes for extracting starch, by washing with cold water and by fermentation, the latter being more efficient.

When starch is to be extracted by cold water, the substance must either be reduced to the state of flour or be broken so that the pulp can be acted upon by the water. In the first place the flour of wheat is kneaded with water till it takes the consistency of a stiff paste; this is placed on a cloth stretched tightly over a tub and cold water thrown upon it; the kneading with the hand is continued till the water runs off clear; the fecula is carried off by the water and deposited at the bottom of the tubs; the water retains in solution the sugar and the extractive matter of the farina, while the insoluble gluten alone remains upon the filter; the deposit is washed to free it from any foreign

substance and then dried. When it is not wished that the substance containing the fecula should be reduced to flour, it may be broken in a mortar or under a millstone, or it may be grated; the pulp is then to be placed upon a very fine horse-hair sieve and water thrown upon it till it runs off clear, care being taken to stir the pulp constantly with the hand and to squeeze it hard. When the substance from which the fecula is to be extracted is fleshy and of a loose, spongy texture, it can be reduced to a pulp by means of a press; the juice thus expressed deposits the fecula, which must be carefully washed in order that the noxious principles contained in it may be perfectly separated. The whiteness and excellence of the fecula depends upon its being thoroughly washed.

Fermentation is the means most commonly employed for extracting starch from grain, but this operation will produce only alcohol if care be not taken in mixing the acid with the grain to prevent the spirituous fermentation. This acid is made by mixing with a bucket of hot water two pounds of baker's yeast, to which is added two days after several buckets of hot water; in forty-eight hours from that time the acid will be sufficiently developed. This acid, which is called by the starch manufacturers *sure water*, is thrown into a hogshead having one end taken out. The hogshead is then filled half full of common water, into which flour is stirred till it is full; the whole is then left to macerate during ten days in summer and fourteen in winter. The sufficiently advanced state of the maceration may be known by a deposit being formed and the liquor above it remaining clear, while the surface is covered with foam or *fat water*. The water and foam are drawn off, and the deposit is thrown into a sack of haircloth, which is placed in a tub and water thrown over it till it runs off without any cloudiness. The substance remaining in the bag, which is only the coarsest part, serves as a food for cattle. At the end of two or three days the water floating above the deposit formed in the tub is drawn off, and a part of it preserved to serve as *sure water* for succeeding operations.

In order to have good starch, the water must be washed in a great deal of water and well mixed; two or three days after the water for the remaining washings may be thrown on. The deposit which forms presents three layers, differing widely

in their quality; the first is principally composed of fragments, and is taken off as food for cattle or to fatten hogs with. The second layer is generally formed of the mealy part of the vegetable mixed with some other substances; the product of this layer is known under the name of common starch. The third layer contains the purest and heaviest starch, but in order to give it all the qualities it ought to possess it must be washed with water, and the water afterward separated from it by filtration through a sieve of silk, so as to free it from all impurities. With these precautions starch may be obtained fitted for any use. As soon as the starch has been well washed it is put into baskets lined with linen to be well drained. It is afterward divided into loaves, and the drying finished by exposing it in the open air upon laths. Before packing for sale, the surface of the loaves, which is lightly colored, is scraped, and the drying of them is completed in the sun or in a stove. Starch acted upon by sulphuric acid is converted into sugar, and in this state may be made to undergo the vinous fermentation; a few years since extensive establishments were formed in France for supplying numerous distilleries with the fecula of the potato which had been treated in this manner.

AMARILLIDACEÆ. (*The Narcissus Tribe.*)

Some of these are poisonous, and Lindley says that it is one of the few of the monocotyledonous orders in which any poisonous properties are found.

SISAL HEMP, (*Agave Sisalana.*)

This gigantic plant has been introduced into Florida by Dr. Henry Perrine, who was consul at Yucatan. It is said by W. C. Dennis, of Key West, (P. O. Reports, 1855, p. 243,) to delight in arid, rocky land, which contains a superabundance of lime. It is adapted probably only to the south of Florida, where it can be cultivated during the absence of frost. It does not require a great deal of culture, but grows on arid, rocky soil around Key West unfitted for any other purpose. "In fact, the land on these keys and much of it on the southern point of the peninsula is nearly worthless for every other agricultural purpose, so far as known, yet there are thousands of acres in this region where a ton of clean Sisal hemp can be made to the

acre yearly, after the plant has arrived at such an advanced state of maturity as will allow the lower leaves to be cut from it, which takes in this climate from three to five years to grow, according to the goodness of the soil. Nor is there any longer a doubt as to the goodness of the fibre, a number of tons having already been collected and sent to market, where it readily brought within a half cent to a cent per pound as much as the best kind of Manilla hemp; that is, in the neighborhood of two hundred and fifty dollars per ton." See article cited for method of planting and preparing. "About a thousand plants should be set on an acre, and from young ones coming up from the long lateral roots; if these be kept at proper distances it will be seen that the same land requires no replanting if coarse vegetable manure be applied from time to time. After the plant is of sufficient growth the lower leaves are cut off at proper times, leaving enough on the top to keep it healthy. These leaves are composed of a soft, watery pulp, and are from two to six feet long, and in the middle from four to six inches wide, being frequently three inches thick at the butt, but having the general shape of the head of a lance. They contain a gum, which is the chief cause of their being rather troublesome in separating the fibres from the pulp. Neither the epidermis nor this pulp is more than a powder after becoming dry if the gum be entirely crushed and washed out."

"This is a most important fact in relation to the manner to be adopted to cleanse the fibres from the pulp. As these are continuous, and parallel, and imbedded in it, I feel certain that a system of passing the leaves through a series of heavy iron rollers firmly set, something after those used in crushing sugar-cane, and throwing water on the crushed leaves, in jets or otherwise, in sufficient quantities to wash out the gum, (which is perfectly soluble in it,) will thoroughly clean out the fibres, without any loss, so that after they are dry, and have been beaten to get out the dust, they will be fit for market; at any rate, the right plan for separating the fibres has not yet been discovered, although there has been enough done at it to show that they can be got at a profit."

I obtain the following statements from the Patent Office Reports, 1856, p. 252, by W. C. Dennis: "The plant evidently requires dry, hot weather, as well as a dry soil; for since I have

observed its growth I have never seen it suffer from drouth in the driest and hottest weather and in the most arid spots, provided its roots could find a plenty of the right kind of soil. The meteorological record for the last twenty-five years shows that this plant is well adapted to these keys and the southern extremity of the peninsula, for such winters as the two designated are evidently rare.

"It would seem that there are lands enough in Florida, south of the limit where the frost would injure this plant, to grow it in sufficient quantities for the present and prospective wants of the country, and that, too, in a frontier region which it is of national importance to settle. As far as known, these lands are not well adapted to an extended range of agricultural products, yet I am certain that the tropical Agaves in all their varieties will flourish here in the greatest perfection.

"Mr. Hermonds, of Indian River, Florida, says that Sisal hemp grows well there, and has continued to thrive well for years. He thinks that my last year's estimate of the product per acre is too low for that region. The experiments I have made within the past year in getting out a number of tons of this fibre convince me there are but few difficulties in accomplishing this work cheaply. These experiments prove that if all the vesicles of the leaves are ruptured by crushing or rolling, the pulp and gum are easily washed out either by salt water or fresh. The plan which I found most successful was to roll the leaves, being careful to rupture all the vessels, then confine these crushed leaves in an open-work wooden frame or box, which I placed in such a manner that the tides forced the sea-water through them both at the ebb and flow. In this manner the gum and pulp were so far washed out in from three to six days (according to the temperature of the air and water) that by beating the fibres a little after they were dry they were fit for market.*

"Mr. Hermonds mentioned as a tested fact that steeping the crushed leaves in boiling water, even for a few minutes, at once dissolved the gum and cleaned the fibre. This renders it almost certain that where a steam engine is used to propel rollers and crush the leaves the waste steam can be rendered effective to

*Would not this method be objectionable on account of the difficulty of drying the fibre or the materials manufactured therefrom? D. J. B.

clean this hemp by blowing it off between the rollers, aided by a little water in a jet, while the leaves are passing through.

"The amount of the imports and consumption in this country of fibres similar to Sisal hemp in 1854, was over $2,500,000, of which more than $1,500,000 was for Manilla and Indian hemps, and over $1,000,000 for gunny bags and cloth, jutes, etc.

"I am of opinion that this hemp can be cleaned, and cheaply, by running the leaves through a series of powerful rollers, having water dashed on them during the operation; and this plan would be much facilitated in this region from the fact that the gum of the leaves seems equally soluble in salt water as in fresh. But experiment must decide which of the methods would be the best. Care must be taken not to allow the leaves or fibres to come in contact with the mud or other substances which will stain them while they are in a damp state; and it will be well to have them in the sun, or strong light, while under the process of cleaning and drying; for the juice of the plant is both a saponaceous and a bleaching fluid.

"Last year I spoke of the fact that the celebrated pulque plant (*Agave pulque*) was introduced by Dr. Perrine. It grows enormously large here where there is sufficient depth of soil, and although I presume that the mean temperature is too high to make from it the Mexican drink, yet alcohol could be distilled from its juice, and probably the leaf can be made to yield a cheap and abundant material for *paper*. The ancient Aztec made much of the paper on which his picture-writing was transcribed out of the leaves of one or more of the varieties of the Agave; and this pulque plant most likely is one of the kinds; for its thick, fleshy leaves, containing very fine fibres, are sometimes eight feet long, and from seven to eight inches broad."

Agave Virginica, L. Called by negroes rattlesnake's master. Grows in damp soils; collected in Wassamasaw, St. John's; vicinity of Charleston.

Ell. Bot. i, 402. A domestic remedy for flatulent colic; used in Charleston District for the bite of the rattlesnake.

ATAMASCO LILY, (*Amaryllis atamasco*, L.) Grows in damp soils; collected in St. John's; vicinity of Charleston.

Ell. Bot. i, 384. This is supposed to produce the disease in cattle called "staggers."

Pancratium maritimum, Walt. *Pancratium Carolinianum*, L. "Seen by Catesby in the Parachucla savanna, St. Peter's Parish," Ell.; collected on Cooper River, St. John's.

Mér. and de L. Dict. de M. Méd. v, 179; Dioscorides, lib. ii, c. 168. Pliny also speaks of it, lib. xvii, c. 12. The bulbs are bitter and emetic, and are useful in dropsy. Loiseleur, Manuel des Plantes Indigènes, 10. In the experience of one writer forty grains of the powder produced vomiting five times.

HÆMODORACEÆ. (*The Blood-root tribe.*)

Dilatris tinctoria, Ph. *Lachnanthes*, Ell. Sk. Newbern; Florida.

Griffith Med. Bot. 622. The root is astringent and tonic. It is distinguished, says Wilson, for yielding a beautiful dye: hence the name. Rur. Cyc.

BURMANMACEÆ.

BLUE TRIPTERELLA, (*Tripterella cœrulia*, L.) Grows near Savannah and Purysberg; collected in St. John's, near Pinopolis; vicinity of Charleston. Fl. Nov.

Lind. Nat. Syst. Bot. 331; Nuttall, in Acta, Philad. 723. A flavor like that of green tea is discernible in this plant.

IRIDACEÆ. (*The Corn-flag Tribe.*)

BLUE FLAG, (*Iris versicolor*, L.) Var. *a* and *b*. Grows in bogs, morasses and inundated lands; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Coxe, Am. Disp. 354; Lind. Nat. Syst. Bot. 333; U. S. Disp. 405; Big. Am. Med. Bot. 105; Bartram's Travels, 451; Cutler's Mem. Am. Acad. 405, 6; Ell. Bot. 146; Mér. and de L. Dict. de M. Méd. iii, 659; Frost's Elems. 279.!

The expressed juice is acrid, and has been employed as a local application; it is also purgative, and sometimes occasions distressing nausea like sea-sickness, accompanied with prostration of strength. The plant is, however, more remarkable for its diuretic powers. It was prescribed by Dr. McBride with great success in dropsy, combining it with the button snakeroot, (*Eryngium yuccæfolium.*) The proportions are as follows: root of blue flag one ounce; button snakeroot two drachms; water half a pound; which is to be boiled down to one pint

and taken in divided doses. See Bigelow. This does not disturb the stomach, and was used with success in cases of hydrothorax combined with anasarca. Bartram said the root was considered by the Indians a very powerful cathartic, and it was found in artificial ponds made for the purpose near their villages. See his Voyage dans la partie sud de l'Amérique Septentrionale, ii, 322, and the Supplem. to Mér. and de L. 1846. According to Bigelow its active chemical constituent seems to be *resin*, which separates as a white precipitate when water is added to the alcoholic tincture. This plant is much employed in domestic practice in St. John's in dropsy.

Dr. H. M. Andrews, of Michigan, has employed it frequently as a cathartic, and found it when combined with a grain of Cayenne pepper, or two grains of ginger, not less easy and effectual in its operation than the ordinary or more active cathartics, and preferable on account of its less disagreeable taste. N. Y. J. Med. ix, 129. It may be given in substance, decoction or tincture. The dose of the dried root is from ten to twenty grains. Under the unscientific name of *iridin* or *irisin*, which Dr. Wood says should be reserved for the pure, active principle when discovered, the "Eclectics" have for some time used an oleo-resin, obtained by precipitating a tincture of the root with water, and mixing the precipitate with an equal weight of some absorbent powder, for which purpose powdered liquorice root would probably answer well. This may be given in the form of pill in the dose of three or four grains. It is thought to unite, he adds, chologogue and diuretic with aperient properties; and a writer in the London Lancet states that he has found it to produce similar effects to those caused by a mixture of blue pill, rhubarb and aloes, (Aug. 30, 1862,) U. S. Disp., 12th Ed. See, also, publications of the "Eclectics."

Iris Virginica and *I. verna.*

Griffith Med. Bot. 625. They are said to possess properties similar to those of the *I. versicolor.*

BLUE-EYED GRASS, (*Sisyrinchium Bermudiana*, L. *Sisyrinchium mucronatum*, Mx.) Fla. and northward.

The roots of our native species are acrid, and a decoction of them is said to be purgative.

Dr. J. H. Mellichamp writes me that "a tea from the root is used by the people about Orangeburg, S. C., as an emetic, which was said not to act harshly yet very promptly and efficiently."

BROMELIACEÆ. (*The Pineapple Tribe.*)

LONG MOSS, (*Tillandsia usneoides*, Linn.) Grows within the tertiary districts of South Carolina; I have observed it as high up as Columbia; Newbern.

Mér. and de L. Dict. de M. Méd. vi, 743; Journal de Pharmacien, iii, 185. It is stomachic, purgative, and even diuretic. Employed in hemorrhoids. *Op. cit.* I see no notice of it in the American works. Great use is made in South Carolina of this plant when dried in stuffing chair cushions, mattresses, etc. It is stated in a journal, 1863, that Messrs. Segur & Bryars, of Union Springs, Ala., are preparing to enter largely on the manufacture of rope from moss. It can be obtained in abundance. It gives to the trees in winter quite a venerable and pleasing aspect, and is an indication of great moisture.

ORCHIDACEÆ. (*The Orchis Tribe.*)

Some species of orchis are said to possess aphrodisiac properties. The roots when boiled are farinaceous and eatable, furnishing an article of food. Attention is invited to those growing in the Southern States, among which are severel beautiful species. They may yield salep.

Bletia verecunda, N. Elliott is doubtful whether it grows in South Carolina. Mich. cultivated it near Charleston; East Fla. Chap. Fl. Aug.

Lind. Nat. Syst. Bot. 239. The cormus is said to be stomachic and tonic; see Browne's Jamaica.

Platanthera cristata, Lindl. *Orchis cristata*, Mx. Fla. and northward.

Dr. W. T. Grant reports in the Confed. S. Med. J., June, 1864, that the *P. stricta* has great reputation in Ga. in the cure of snake bites.

Bletia aphylla, Nutt. Fla. and N. C.

The tuberous root, as well as the whole plant, contains a great deal of gum and starch. It has a gummy taste, and is closely related with *Aplectrum hiemale*, (*Corallorrhiza* of Ell.,) which has the name putty-root, probably from the same property of gumminess and adhesiveness. The granules of the first named can be seen with the microscope. I have ascertained that it forms an excellent gum in place of Spalding's

glue or gum-arabic. Paper united by means of it tears before it will separate. It should be well broken up in a little water. The putty-root is said to be a good cement for glass or China.

CORAL ROOT, (*Corallorrhiza odontorhiza*, Nutt.) Fla. and northward.

The root has a strong peculiar odor, and is said to hold a high place in the Materia Medica of the "Eclectics" as an energetic diaphoretic, as it is destitute of general stimulating properties, being given in fever and inflammatory affections. Thirty grains of the powder are given every two hours. U. S. Disp., 12th Ed.

Arethusa bulbosa, L. Bogs on Mts. of Carolina. Mx.

Schœpf says that the bulbs are useful in toothache and for maturating boils.

YELLOW LADY'S SLIPPER; YELLOW MOCCASIN, (*Cypripedium pubescens*, W.) Newbern.

Griffith Med. Bot. 640. It is employed by the Indians, and held in high estimation in domestic practice as a sedative and anti-spasmodic, acting like valerian in alleviating nervous symptoms; said to have proved useful in hysteria, and even in chorea. A teaspoonful of the powder is taken at a dose. *Op. cit.*, and Raf. Med. Fl. 140. More use might be made of this tea as a quieting agent in place of paregoric; see "Tilia."

My friend, Dr. Miles Starke, of Va., has the highest opinion of the virtues of a strong decoction of this plant, (two ounces to a pint of water,) in secondary syphilis. He used it exclusively in a number of cases and with success, preferring it to Iodide of Potash. It is slightly diuretic.

Our other species, *C. spectabile* and *C. acaule*, are said to possess similar properties. R. P. Stevens, of Ceres, Pa., states that he has found the two last, especially when growing in dark swamps, to be possessed of narcotic properties, and to be less safe than the *C. parviflorum*, which is gently stimulant with a tendency to the nervous system and is quite equal to valerian. N. Y. Journal of Med. iv, 359, and U. S. D., 12th Ed. Dr. Ives considers *C. pubescens* the most powerful. Trans. Am. Med. Assoc. iii, 312.

The Eclectics use a substance called *cypripedin* "by precipitating with water a concentrated tincture of the roots" a complex substance, which, Dr. Wood says, has no right to the name, which should be reserved for the active principle.

Dr. E. Ives has employed the *C. pubescens* "in a variety of nervous diseases with advantage, and has known it even to cure epilepsy. The other complaints mentioned by him are hypochondriasis, neuralgia and morbid sensitiveness of the nervous system generally, and especially of the eye." Powder, infusion or tincture used; U. S. D.

Epidendrum. Our two species should be examined as they are closely related to the vanilla.

Goodyera pubescens, R. Br. Fla. and northward.

The leaves have been used by empirics in scrofula, both internally in decoction, and externally as a cataplasm, with some success. Griffith.

PALMACEÆ. (*The Palm Tribe.*)

SAW PALMETTO, (*Chamærops serrulata*, L.) Grows on the coast of South Carolina, and at Blythe's Island, in Georgia. Mr. Elliott says that it extends also through the pine lands of that State.

Shec. Fl. Carol. 435. The pulp is very sweet, but is possessed of a purgative property, often producing a copious evacuation attended with griping.

A correspondent, "F. I. S., of Charleston "Mercury," from Waresboro', Ga., writes as follows in adding to our "resources:"

"You speak of black moss for mattresses. Our common saw palmetto leaves, when split into shreds with a fork or hackle, boiled and dried in the sun one or two days, make a light, clean, healthy and durable mattress. Let me suggest that palmetto pillows would be cheap and comfortable for our soldiers on the coast; their corn and flour sacks would in the absence of anything better furnish ready-made pillow ticks. Our negroes are busily employed in making light, durable and handsome palmetto hats. A bed made from a downy swamp plant, which our people call cat's tail, took a premium at the late Agricultural Fair in Carolina."

TALL PALMETTO; CABBAGE TREE, (*Chamærops palmetto*, Mich. *Corypha palmetto*, Walter.) Grows along the seacoast; vicinity of Charleston.

Ell. Bot. Med. Notes, i, 432.

From this noble and characteristic tree is derived the well known armorial emblem on the escutcheon of the State of

South Carolina. It scarcely needs any description at my hands. It has been carried in the fore-front of battle by every regiment in the service of the State from Mexico to Manassas. The leaves are employed in the manufacture of hats, baskets, mats, etc. Forts, wharves, conduits and structures under water are made of the logs, which do not splinter. The cabbage, or expanded embryo, may be classed among the "most delicious vegetables produced for our tables." The tree, however, perishes when deprived of these. State enactments should forbid their destruction, for ere long when the supply is exhausted the tree will still be absolutely required. Griffith says (Med. Bot. 614) that the bark contains tannin. I am informed by persons living in Beaufort, S. C., that the root is used for tanning leather. The juice when fermented makes a palatable palm wine, which is a property of the East India species of *corypha*. Our "Blue Palmetto" (*C. hystrix*) has thorns like porcupine quills.

Pieces of the spongy part of the stem afford a very good substitute for scrubbing brushes, and are much used in Carolina and Georgia. The leaves of the smaller species afford excellent and durable thatch for covering barns and out-houses; and the younger leaves of the cabbage tree are manufactured into beautiful light and durable hats. The leaves are whitened by brushing a solution of oxalic acid over them once or twice and then exposing them to the fumes of burning sulphur. During the recent war the tree has been highly useful for this purpose. The repent caudex of the saw palmetto, (Farmer's Encyc.,) being torn from the surface of the earth, cut into proper lengths, dried and burned to ashes, produces the greatest quantity of potash of any known vegetable. The drupes, or large berries of this species, which are of the size and figure of dates, and as sweet, afford good and nourishing food to the Indians and hunters. They are not palatable to white people till they become accustomed to them. *Op. cit.*

DWARF PALMETTO, (*Sabal Adansonii*, Guerns. *Sabal pumila*, Ell.) Swamps in lower districts.

Excellent fans may be made of the leaves. The "bane and antidote" are both present in abundance in the same locality—innumerable mosquitos and the palm-like leaves of the dwarf palmetto!

MELANTHACEÆ. (*The Colchicum Tribe.*)

"Poisonous in every species."

Melanthium Virginicum, W. Grows in wet soils.

Griffith Med. 641. In infusion it is an effectual anthelmintic. It will operate as an active poison. The decoction, used as a wash, is a certain but somewhat dangerous cure for the itch.

COMMON BLAZING STAR; DEVIL'S BIT, (*Chamælirium luteum*, Gray. *Chamælirium Carolinianum*, Willd. (K'th's En. Pl.) *Helonias dioica*, Ph. and Ell. Sk.) Grows in damp pine barrens; collected in St. John's, Charleston District, near Pinopolis; vicinity of Charleston; Newbern. Fl. July.

Lind. Nat. Syst. 348; Ell. Bot. i, 423; De Cand. and Dubug. 472, an. 1828; Matson's Veg. Pract. 218. The infusion is anthelmintic and the tincture tonic. Prof. Ives recommends it as efficient in checking nausea and vomiting. The Indian women employed this plant in preventing abortion. It is used by the vegetable practitioners in debility of the digestive organs, given in doses of a half teaspoonful of the powder in warm water three times a day. The root when chewed relieves cough.

FLY POISON; FALL POISON, (*Amianthium muscætoxicum*, Gray in K'th's En. Pl. *Helonias erythrosperma*, Mx. and Ell Sk.) Grows in rich, shaded soils; collected in St. John's; vicinity of Charleston; Fla. Fl. May.

Ell. Bot. 421. "A narcotic poison, employed in some families to destroy the house-fly. The bulbs are triturated and mixed with molasses. The flies, if not swept in the fire, or otherwise destroyed, revive in the course of twenty-four hours." Its foliage poisons cattle which feed upon it in autumn. I would invite others to an examination of this plant as a remedial agent, as well as the allied genus *Xerophyllum* and others.

ITCH-WEED; INDIAN POKE; WHITE HELLEBORE; CROW POISON, (*Veratrum viride*, *Veratrum album*, Mich.) Abbeville District, S. C.; grows in mountain streams.

Lind. Nat. Syst. 348. "An acrid emetic and powerful stimulant, followed by sedative effects." Big. Med. Bot. ii, 125. Dr. Tully also says it is a deobstruent or alterative, an acrid narcotic, an emetic, an epispastic and an errhine; found very useful in gout, rheumatism, diseases of lungs, and some complaints of the bowels. Osgood, in the Am. Journal. Med. Science, states

that it is perfectly certain in its operation and is, in all respects, analogous to colchicum, which it should supersede. Bigelow mentions that in his hands it has arrested the paroxysm of gout, and has given relief in some cases of protracted rheumatism. It has been externally employed, in the form of ointment, in many cutaneous affections. Mr. Worthington, who made a full analysis, found *veratria*, gallic acid, extractive, etc. See Am. Journal Pharm. N. S. iii; Dr. Osgood's examination, Am. Journal Med. Sci. 1835, and Am. Journal Pharm. i, 202, N. S.; Griffith Med. Bot. 644; Am. Journal Pharm. N. S. iv, 89; Raf. Med. Fl. 585. The tincture or the extract is the best form of administration; the dose of the first is thirty drops, of the latter one-third of a grain, gradually increased. Kalm says that corn soaked in a strong decoction will be protected against the encroachment of birds; those that eat of it becoming giddy fall to the ground, and thus deter others. The plant is considered eminently deserving the attention of the profession.

The above was written in my Report printed in 1849. The great value of this plant is now (1863) fully recognized as a depressor of the heart's action. It is also emetic and expectorant. As it is scarce, our other species, *V. intermedium*, growing in Florida, and *V. parviflorum* of Mx., found in the mountains of North Carolina, should be examined. Many of the recent journals and medical treatises contain full descriptions of the application of the *V. viride* to the treatment of typhoid and yellow fevers, pneumonia, etc. See Charleston Medical Journal for Drs. Ford and White's paper on the treatment of yellow fever with this agent. The same journal (vii, 768) contains papers by Norwood, J. A. Mayes and others on the employment of this powerful sedative. See, also, a full account of the properties and uses of this plant by Dr. J. Bell in the N. A. Med. Chirurg. Rev. ii, 914. Its discovery is encouraging to those who believe that the same perseverance and enlightened skill which gave us quinine, morphia and chloroform, may add still more conquests, as greater familiarity is attained with the vegetable wealth of our country. Dr. C. R. Harris reports in the Confed. S. Med. J. Aug., 1864, a violent case of maniacal excitement from drink which was relieved by eight drops repeated, of Dr. Norwood's Tincture. He also recommended it in acute inflammations of the brain or its membranes. I have used it

repeatedly in pneumonia and typhoid fever, both in private practice and whilst in charge of military hospitals at Norfolk and Petersburg, and have found it often advisable to give stimulants and supportive treatment at the same time. I have also seen it relieve violent coughs coming on suddenly and dependent upon nervous irritation. The dose of the tincture of *V. viride* is three to four drops, cautiously increased. The remedy for an overdose is alcoholic stimulants. Dr. Norwood, of South Carolina, deserves great credit for establishing the method of using the *V. viride.* His tincture is made by macerating eight ounces of the dried root in sixteen ounces of alcohol for two weeks; dose, from six to eight drops, repeated cautiously every three hours, gradually increasing till its effects are produced. The roots should be collected in autumn; they deteriorate.

Veratrum parviflorum and angustifolium. Both are found at the South; they are probably active, and should be examined.

INDIAN CUCUMBER; VIRGINIAN MEDEOLA, (*Gyromia Virginica, Medeola Virginica,* Linn. and Ell. Sk.) Grows in moist soils; generally found under beech trees; Newbern. Fl. June.

U. S. Disp. 274. Pursh states that the root was eaten by the Indians. Dr. Barton thought it useful in dropsies. Bart. M. Bot.; Lind. Nat. Syst. Bot. 318. It enjoys some reputation as a hydragogue. Mér. and de L. Dict. de M. Méd. iv, 270; according to which it is esteemed a very active diuretic. De Cand. Essai, 293.

BIRTHWORT, (*Trillium sessile,* L.) Rare; grows in rich shaded soil; collected in St. John's, near Wantoot Pl.; vicinity of Charleston; I have observed it on the Ashley road. Fl. May. It belongs to the Smilax family.

Lind. Nat. Syst. Bot. 348. "Roots generally violently emetic." The species are astringent, tonic and alterative, used by the Indians in diseases of females, and as preparatory to parturition. Riddell, Griffith. We have several species in the Southern States.

Trillium erectum. Dr. Wood states (U. S. Disp., 12th Ed.) that the roots of the plants of the genus Trillium were noticed as medicinal in Henry's Herbal. published in 1812; and that Dr. H. S. Williams published papers concerning them in the N. Eng. Journ. of Med. and Surg. in 1820, and in N. Y. Journ.

Med. viii, 94. The following account is furnished by Dr. Wood: The roots have a somewhat balsamic odor and taste, and produce, when chewed, a sense of heat and irritation, with an increased flow of saliva. A root received by Mr. E. S. Wayne, of Cincinnati, was found by him to give a deep blue with tincture of iodine. He found in it an acrid principle, analagous to senegin and saponin in the property of frothing with water; half a grain in two ounces of water being sufficient to show this property, (Proc. Am. Pharm. Assoc. 1856, and Am. J. Pharm. xxviii, 512.) Besides this acrid principle the Trillia roots are said to contain volatile oil, gum, starch, extractive, resin, and tannic acid. They are astringent; and tonic, expectorant and alterative properties have been ascribed to them. The complaints in which they are said to have proved most advantageous are the hemorrhages; but they have also been used in cutaneous affections, and externally in obstinate ulcers. Dr. Williams gave a drachm of the powdered root three times a day. Of the different species *T. erectum* is generally esteemed most active. *T. pendulum* (not included by Chapman in his So. Flora) is referred to in the Peninsular and Independent Med. Journ., Jan., 1859, 187, as among the most valued medicinal plants of Michigan, being used especially in menorrhagia. U. S. Disp.

LILIACEÆ. (*The Lily Tribe.*)

DOG'S TOOTH VIOLET; ADDER'S TONGUE, (*Erythronium Americanum*, L. *Erythronium lanceolatum*, Ph.) Grows in the upper districts and in Georgia; sent to me from Abbeville by Mr. Reed. Fl. April.

U. S. Disp. 318; Big. Am. Med. Bot. iii, 151; Mér. and de L. Dict. de Mat. Méd. iii, 147; Coxe, Am. Disp. 269; Bart. Flora N. Am. 133; Griffith Med. Bot. The recent bulbs are emetic when powdered and given in doses of twenty to forty grains. When dried or cooked they become eatable. The berries are said to be more active and certain in their operation than the root.

BEAR-GRASS; ADAM'S NEEDLE, (*Yucca filamentosa*, L.) Diffused; I have collected it in Sumter District, S. C.

A tincture of the roots is much employed in rheumatism. I am told by correspondents in Statesburg, S. C., that in large

doses it produces giddiness. This statement should excite further attention to the plant. The "Cherokee doctors" use it in the form of a poultice of the roots, or a salve, as a local application in allaying inflammation.

The fibre is uncommonly strong, and is used for various purposes on our plantations: for making thongs for hanging up the heaviest hams, bacon, etc. I do not know whether it has been tried as a substitute for hemp and cordage, as Mr. W. G. Simms suggests in a letter to me.

I have since (July, 1862) seen an article in the Charleston Courier, entitled "Confederate Flax," in which it is stated that Mr. D. Ewart, of Florida, had presented for exhibition "specimens of scutched fibre, and of cordage and twine of different sizes, made from the very common plant familiarly known as bear-grass, or Adam's needles." He also communicated the processes employed in reducing it to cordage. The Columbus (Ga.) Sun, of a later date, reports a coil of rope made by Mr. Jas. Torrey, which was pronounced by competent authority to be equal to Kentucky rope. The plants in the above instance were rotted and prepared by negroes.

Gov. Call, (see Southern Cultivator, p. 27, vol. 5, 1847,) in stating that the Bear-grass is an evergreen, says that it may be prepared for use at any season, as it sustains no loss or depreciation by remaining in the ground. Six months' growth will give a plant of good size, and the hemp made from such a plant will be as long and possess quite as much strength as that made from plants of older growth. But it will have fewer leaves, and consequently produce less fibre. It will require planting but once in a lifetime, and with but little culture will produce abundant crops of five or six tons per acre. "After boiling the leaves and putting them up in small bundles of convenient size for the purpose, I have passed them through an ordinary wooden sugar mill, dipping them in water at each passage until the surplus matter has been removed, leaving the fibres perfectly cleansed, unimpaired, and ready for use." It can be propagated by cutting the roots, like the sweet potato. The same number contains a report from the Secretary of War upon the same subject. Congress allowed Dr. Perrine a grant of land in Florida for the purpose of raising Sisal and other hemp plants. His death defeated the enterprise.

ONION-TREE; MEADOW GARLIC, (*Allium Canadense*, W.) Grows in damp soils; Newbern; Fla. and northward.

Griffith Med. Bot. 653. It is employed as a substitute for the common garlic, and it is said to be fully as efficient. Its top bulbs are greatly prized for pickling, being considered of superior flavor to the common onion for that purpose. For cultivation, see Farm. Encyc., G. W. Johnson. Most of the exotic alliaceous plants, the leek, onion, garlic, etc., are cultivated in the Southern States. Cotton or wool wet with the juice of garlic, and applied to the ear, is said to relieve deafness. The juice or syrup is given to infants with colic; a few drops being used in place of paregoric. Said to be both stimulant and carminative.

WILD GARLIC, (*Allium Carolinianum.*)

Several species of alliaceous plants grow within the Southern States. The juice of garlic acts medicinally as an expectorant. It is a strong cement for broken glass and China. Preparations of garlic will expel snails, grubs, moles, worms, etc., placed near their haunts. Wilson's Rural Cyc.

Schoenolirion Michauxii, Torr. Swamps and pine barrens; Florida and westward. Chap.

The bulbous roots of this and the *Nolina Georgiana*, Mx., are allied to the squill, and should be examined.

STAR-GRASS; BLAZING STAR; AGUE ROOT; UNICORN ROOT, (*Aletris farinosa*, L.) Diffused in damp pine lands; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Big. Am. Med. Bot. iii, 92; Pe. Mat. Med. and Therap. ii, 121; Frost's Elems. 283; Mér. and de L. Dict. de Mat. Méd. i, 161; Lind. Nat Syst. Bot. 353; Clayton's Phil. Trans. Ab. viii, 333; Cutler, Am. Acad. i, 435; Griffith Med. Bot. 623. "The root is tonic and stomachic in small doses, but one of twenty grains occasions nausea, with a tendency to vomit." Lind. Nat. Syst. Bigelow knew of no plant exceeding this in genuine, intense and permanent bitter. Pursh says it is an excellent remedy in colic; Cullen, in chronic rheumatism; and Dr. Thacher, in dropsical affections. Infused in vinegar, it is given in intermittent fever attended with dropsical accumulations. The decoction of the root and leaves in liberal doses is much employed in popular practice in the lower portions of

South Carolina. The root is quite resinous, and is supposed to contain a portion of extractive matter, hence its use in coughs and colds, as it does not at the same time impair the tone of the digestive organs. It is said to produce soreness of the mouth. Ten grains act as a tonic. The tincture is the strongest preparation. It is employed also by the vegetable practitioners. See Howard's Imp. Syst. Bot. Med. 285.

YELLOW STAR-GRASS, (*Aletris aurea*, Walter.) Grows in similar situations; collected in St. John's Berkeley, near Pinopolis; vicinity of Charleston. Fl. July.

Ell. Bot. Med. Notes, i, 39; Frost's Elems. 283; U. S. Disp. 67. It is purgative and nauseating in large doses, probably possessed of properties similar to the above.

LILY OF THE VALLEY, (*Convallaria majalis.*) According to Elliott, grows on the highest mountains of South Carolina.

Bull. Plantes Vén. de France, 164. The power of the leaves is said to be a very active sternutatory. Dém. Élém. de Bot. by Gillibert, ii, 6. Some practitioners order the powder of the leaves in epileptic affections, depending upon verminous influence. The flowers furnish a good deal of essential oil. "We have tried with success a powder of the flowers in inveterate pain of the head." Trans. from *op. cit.* This was taken in the nostrils as snuff. Dr. Wood, in the U. S. Disp. 1249, confirms the assertion in reference to the power the flowers possess of exciting sneezing. They have a delightful odor, resembling that of musk, and when dried and powdered are much employed as a sternutatory, acting sometimes quite violently. According to Mérat they are esteemed in nervous headaches and vertigo; and when pulverized are emetic and purgative. See Diss. Botanico Med. Inaug. de Lilium. Conval. 1718, Al Torfii; Diss. Inaug. at Gottingen, 1757; one by Misdorf, in 1742; and another by Schultze, in the same year. Shec., in his Flora Carol. 431, states that the dried flowers are narcotic. "The extract of the root and flowers possesses purgative properties similar to aloes." The poultice of the root enjoys some celebrity for taking away the marks of bruises, etc. With the addition of lime to the leaves a beautiful green color is obtained. The dose of the simple distillation of the flowers is four ounces; when powdered sixty grains; of extract two to three grains. The berries are large, and scarlet colored. The plant is much

admired and cultivated throughout Europe. The dried flowers have a narcotic odor, and when pulverized they provoke sneezing, and may be used as a sternutatory. Rural Cyc.

G. F. Walz, by a chemical analysis, has discovered two principles, *convallarin* and *convallamarin*, (Am. J. Pharm., Nov., 1859.) Taken internally the flowers are said to be emetic and cathartic, and their extract purges actively in the dose of half a drachm. U. S. Disp., 12th Ed.

SOLOMON'S SEAL, (*Convallaria multiflora*, *Polygonatum multiflorum*, Desfont. and Ell. Sk.) Grows in damp soils.

U. S. Disp. 1249. This is used in similar cases with the European species, (the *Con. polygonatum*,) the root of which was employed as a cosmetic, and which, according to Hermann, is a good remedy in gout and rheumatism. See Nouv. Journal de Méd. v, 209. Thirty grains of the dried root is given in Russia as a preventive against plague. Bull des Sc. Méd. v, 209. Dr. G. M. Maclean considers the *C. polygonatum* one of the best diuretics he has used when given in infusion. N. Y. J. Med. x, 375; U. S. Disp., 12th Ed. Mills, in his Statistics of S. C., states that from the leaves a beautiful and durable green color can be obtained.

Polygonatum biflorum, L. *P. pubescens*, Pursh. This, *Convallaria majalis*, (lily of the valley,) and species of the genus *Smilacina*, (Solomon's seal,) growing in the Southern States, yield starch from their roots. I have often noticed the tuberous roots of *Convallaria biflora*. Starch is abundant in them.

Uvularia perfoliata, L. Grows in damp soils; collected in St. John's. Fl. June.

Griffith's Med. Bot. 641. The roots of the different species are subacid and mucilaginous when fresh; and a decoction of them has been employed as a domestic remedy in sore mouth and in affections of the throat; also considered as alexipharmic in snake bites. The roots are, however, edible when cooked, and the young shoots are a very good substitute for asparagus. See, also, *Smilax*.

Uvularia sessiliflora, L. Collected in St. Stephen's Parish, S. C.; in damp soils. Fl. July. Similar in properties to the above.

ASPARAGUS, (*Asparagus officinalis*, L.) Ex. Nat. on banks of Cooper River; vicinity of Charleston, Bach. Fl. May.

Mér. and de L. Dict. de M. Méd. Supplem. 1846, p. 73. A preparation in the shape of a syrup was much in vogue as a powerful sedative in palpitation of the heart, used by Broussais. Journal de Pharm. xix, 667. Its diuretic property is well known. Révue Méd. 1838, p. 409. See M. Lodiberts on its culture, and an account of the alcoholic fermentation from the branches, in the Journal de Méd. Militaire. Mannite is said to exist in the celery, melon and asparagus.

Asparagus for Coffee.—Liebig states that asparagus contains, in common with tea and coffee, a principle which he calls *taurine*, and which he considers essential to the health of those who do not take strong exercise. By this a writer in the London Gardener's Chronicle was led to test asparagus as a substitute for Coffee. He says: "The young shoots were not agreeable, having an alkaline taste. I then tried ripe seeds, and they, roasted and ground, make a full flavored coffee, not easily distinguished from fine Mocha. The seeds are easily freed from the berries by drying them in a cool (warm, I suppose he means) oven, and then rubbing them on a sieve. There is in Berlin, Prussia, a large establishment for the manufacture of coffee from acorns and chiccory, the articles being made separately. The chiccory is mixed with an equal weight of turnips to render it sweeter. The acorn coffee, which is made from roasted and ground acorns, is sold in large quantities, and frequently with rather a medicinal than an economical view, as it is thought to have a wholesome effect upon the blood. Acorn coffee is, however, made and used in many parts of Germany for the sole purpose of adulterating genuine coffee." Annual of Scientific Discovery. See "Okra."

COMMELINACEÆ. (*The Spiderwort Tribe.*)

Commelina communis, Pursh. Grows in pine barrens; collected in St. John's; vicinity of Charleston; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. ii, 272. In Cochin China it is said to be employed as a refrigerant and relaxant; prescribed in constipation and strangury. The flower is of a beautiful blue, and Kæmpher says that a color like *ultramarine* might be obtained from it.

ALISMACEÆ. (*The Water Plantain Tribe.*)

All are aquatic plants, and many contain a fleshy rhizome which is eatable.

ARROW-HEAD, (*Sagittaria sagittifolia*, Mich. *Sagittaria latifolia*, W.) Grows in rice fields; collected on Cooper River; I have specimens from Sumter District; vicinity of Charleston; Newbern. Fl. July.

Mér. and de L. Dict. de M. Méd. vi, 153; Journal Comp. des Sc. Méd. xix, 143. The leaves are acrid, and it is proposed to employ them in dispersing scrofulous ulcers. Dém. Élém. de Bot. ii, 416. The Chinese are said to cultivate it on account of the bulbous roots, which are eaten. It was employed as food by the Indians. Wade's Pl. Rariores, 80. It is said that the leaves, applied to the breasts of nursing women, will tend to dispel the milk. Griffith's Med. Bot. 619. The fecula is like arrowroot, (*Maranta arund.*,) and has been used for similar purposes.

The root of this plant is often of great length. No doubt it contains starch. Our Canna, (*C. flacida*,) growing in Fla. and S. C., very probably yields starch, for the arrowroot, "*tous les mois*," from *C. coccinea*, makes a stiffer jelly than that from the *Maranta* or Florida arrowroot.

WATER PLANTAIN, (*Alisma plantago*, L. *A. trivialis* and *parviflora* of Pursh.) Ditches and ponds; Georgia and northward.

It is used by the vegetable practitioners as a demulcent astringent in affections of the bowels, and by the "Cherokee doctors" as an external application to "sores, wounds, bruises, swellings," etc., being employed as a poultice and wash. The juice will vesicate the skin. The roots cooked may be used as food. When fresh they have an odor like that of Florentine orris, but lose it when dried. The root in the dose of eight or ten grains, largely increased, have recently been used in chorea and epilepsy with asserted advantage. See U. S. Disp., 12th Ed.

HYDROCHARIDACEÆ. (*Frogs-bit Tribe.*)

TAPE GRASS, (*Valisneria spiralis*, Micheli.) Ponds and stagnant water. Fla. and northward.

The fertilization of this aquatic species, as well as that of *Anacharis Canadensis*, found at Cherokee, N. C., is very remarkable. The sterile flowers break away from the stem, and, expanding at the surface of the water, go as it were in quest of the female florets by which their stigmas are impregnated.

JUNCEÆ. (*The Rush Tribe.*)

SOFT RUSH; BULRUSH, (*Juncus communis*, Mey, in K'th's En. Pl. *Juncus effusus*, Linn. and Ell. Sk.) Grows in bogs and morasses; Newbern. Fl. May.

Lind. Nat. Syst. 531. Cultivated in Japan for making floor mats, chair bottoms, etc. It is sometimes employed at the South for similar purposes. The pith, when dried and oiled, will serve as a wick. A decoction of the plant is said to be diuretic.

SMILACEÆ. (*The Smilax Tribe.*)

CHINA-BRIAR, (*Smilax pseudo-China*, L.) Grows in swamps, along streams; collected in St. John's; Newbern. Fl. May.

Ell. Bot. Med. Notes, ii, 700; U. S. Disp. 634; Pe. Mat. Med. and Therap. 133; De Cand. Prodrom. i, 351; Frost's Elems. Mat. Med. 228. The decoction is alterative; in large doses, emetic. It is much used in portions of the Southern States in the composition of diet drinks, and it is considered one of the best substitutes for Sarsaparilla. Griffith Med. Bot. 660, states that the Indians employed the fecula of this, as well as that of the *S. caduca*, *laurifolia* and *tamnoides*, all of which are indigenous.

The roots of this plant contain a good deal of Starch. They are, consequently, to a certain extent light and porous, and are used to make pipes with, also by our soldiers in camp in the manufacture of an extemporaneously prepared beer. The root is mixed with molasses and water in an open tub, a few seeds of parched corn or rice are added, and after a slight fermentation it is seasoned with sassafras. The young shoots of the China-briar are eaten as asparagus, with which they are closely allied. They impart the same odor to the urine, and probably contain *asparagine*.

Lawson, in his "Travels in Carolina," says: "The root is a round ball, which the Indians boil and eat." Croom states in the notes to his "Catalogue," p. 48, that these roots become in time of scarcity an important article of food to the Southern Indians. The Seminoles, of Florida, obtain from them by maceration in water, their red meal, and from the roots of *Zamia integrifolia* their white meal, "which have subsisted them in part during their late campaign."

Mr. W. G. Simms informs me that a rich brown dye is made from the roots with copperas.

The seeds of the berries are exceedingly hard, and are used as beads. I have seen a necklace made with them resembling coral, which may well be called "Indian coral."

WILD SARSAPARILLA, (*Smilax sarsaparilla*, L. *Smilax glauca*, Walt.) Rich soils; Abbeville District; Fla. Fl. July.

U. S. Disp. 634; Woodv. Med. Bot. 161. This does not appear to be the officinal Sarsaparilla, though it probably shares the alterative virtues belonging to the genus. Thornton's Fam. Herbal. 241; Journal de Pharm. xvi, 38; Frost's Elems. Mat. Med. 223. It is supposed to be possessed of undoubted efficacy, given in diet drinks and alterative mixtures combined with the China-briar, and used in syphilis and chronic rheumatism. Mér. and de L. Dict. de M. Méd. iii, 79; Humboldt's Voyage, viii, 378; Analysis in Journal de Chim. Méd, i, 215. A principle has been derived from it, called *smilacine*. Journal de Pharm. xvi, 501, and xviii, 324. From Bartley's examination in the Edin. Med. Journal, xvi, 473, the virtues appear to reside in the cortical part; hence, it is best extracted by the cold infusion. Biblioth. Méd. xxvi, 119. According to these writers it is considered a powerful sudorific and alterative, indicated when you wish to produce diaphoresis, as in rheumatism of the joints; and this agrees with the experience of those who have tried it in the Southern States. J. Pope, Recherches upon the different species of Sarsaparilla Gen. de Méd. xci, 300, and Thumberg's Mem. on the quantity of extractive matter furnished by the species. The *S. glauca* of Walt. is the *S. caduca* of Willd.

Smilax caduca, L. Around ponds and in rich shaded soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. June. The *S. caduca* of Ell. is the *S. Walteri* of Pursh.

Mér. and de L. Dict. de M. Méd. vi, 375. Some have asserted

that it furnishes caoutchouc. See Hist. Nat. Pharm. ii, 590. The root affords a fecula.

Smilax ovata, Ph. and Ell. Sk. Grows on the seashore, Ell.; vicinity of Charleston. Fl. June.

Ell. Bot. Med. Notes, ii, 698. Remarkable for the fragrance of its flowers.

Smilax tamnoides, L. Grows in dry soils in rich woods; collected in St. John's; vicinity of Charleston. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 384. The root of this also, says Mérat, is employed in the form of decoction to purify the blood. It affords a fecula.

Coprosmanthus herbaceus, Kunth. *Smilax herbacea*, L. Grows in rich wooded soils; collected in St. John's; vicinity of Charleston. Fl. June.

This species has been used for its alterative properties.

The father of the writer, an ardent cultivator of Botany, had invited his attention years since to a plant called the "Carrion plant." It escaped all inquiries till very recently, when a close examination of the *C. herbacea* again revealed to him the remarkable fetor which it exhales, and which closely resembles the smell of decayed flesh. A recent examination of Darlington's Flora Cestrica has established the correctness of his suspicions, for he speaks of the *S. herbacea* as the "Carrion plant." The plant is a very pretty one, and Prof. Torrey in forming a new genus has given it a very appropriate name. The *C. peduncularis*, K., growing in the upper districts, also possesses fetid flowers. The attention of the curious is invited to these plants.

DIOSCOREACEÆ. (*The Yam Tribe.*)

WILD YAM, (*Dioscorea villosa*, L.) Grows in damp soils; collected in St. John's; vicinity of Charleston. Fl. July.

Griffith's Med. Bot. 659. The decoction of the root, according to Riddell, in a late paper, Synops. Flo. West. St. 93, is eminently beneficial in bilious colic; one ounce is added to one pint of water, and half of this is taken at a dose. He says it acts with great promptitude, and that Dr. Neville places much reliance on the tincture as an expectorant; it is likewise diaphoretic, and in large doses emetic. Attention is invited to its employment.

Prof. Wood, in the recently published edition of the U. S. Disp., states that the "Eclectics" use a principle called *dioscorein* in doses of one to four grains, which "is only the tincture precipitated."

See illustrated papers in Patent Office Reports, p. 169, 1854, and p. 250, 1856, on the Chinese yam (*Dioscorea batatas*) which bears a large tuber, like the potato, and yields starch, sugar, etc. The roots do not require to be stored in cellars, though this may be done; they are dug in the fall. I have seen it growing at Col. J. B. Moore's, near Stateburg, S. C. The root is said to be "voluminous, rich in nutritive matter, and can be cooked in every respect like the common potato, and even be eaten in the raw state." The yam cultivated at the South is *Dioscorea sativa;* another species raised here, *D. alata*, weighs sometimes thirty pounds.

ARACEÆ. (*The Arum Tribe.*)

An acrid principle generally pervades this tribe, existing in some of them to a high degree.

WAKE ROBIN; INDIAN TURNIP; DRAGON-ROOT, (*Arisæma triphyllum*, Torr. *Arisæma atroreubens*, Blum. in K'th's En. Pl. *Arum triphyllum*, L. Ell. Sk.) Grows in rich soils; collected in St. John's; vicinity of Charleston; Newbern. Fl. June.

Eberle, Mat. Med. ii, 437; Chap. Therap. and Mat. Med. ii, 41; U. S. Disp. 123; Pe. Mat. Med. and Therap. ii, 78; Big. Am. Med. Bot. i, 52; Am. Journal Pharm. xv, 83; Thacher's U. S. Disp., art. A. triphyllum, 153; Cullen, Mat. Med. ii, 211 and 554; Mér. and de L. Dict. de M. Méd. i, 460; Coxe, Am. Disp. 121; Schœpf, Mat. Med. 133; Rush, ii, 301; Barton's Collec. 29; Shec. Flora Carol. 273; McCall, in Phil. Med. Journal, ii, 84; Cutler, Am. Acad. i, 487; Lind. Nat. Syst. Bot. 364; Matson's Veg. Pract. 295, and Thompson's Steam. Pract. It is said to be similar in its action to the *A. maculatum*. Dr. Meara affirms that it does not act on the general circulatory, but only on the glandular system, which it stimulates greatly, and the secretions of which it augments. Dr. Wood says it stimulates the secretions of the skin and lungs also. It is used advantageously in diseases of the mucous membranes, particularly in hooping cough and asthma. "In the chronic asthmatic affec-

tions of old people it is a remedy of very considerable value." The powder of the fresh root, made into a paste with honey or syrup, and placed in small quantities upon the tongue so as to be gradually diffused over the mouth and throat, is said to have proved useful in the aphthous sore throat of children. Dr. Thacher employed it in this affection, and adds that it is of approved efficacy in rheumatism. "Milk in which the acrid principle of the *A. triphyl.* has been boiled has been known to cure consumption!" De Cand. cit. in Lind. The sliced root has been used as an application for poisoning by the ivy, (*Rhus.*) Lindley remarks of some of this class that "the spadixes disengage a sensible quantity of heat when they are about to open." An ointment, made by stewing the fresh root in lard, is applied in scald-head, in ring-worm, and other eruptions and cutaneous diseases, acting as a stimulant. The root is a decided expectorant. Agardh considers that the acrid principle, which, notwithstanding its fugacity, has lately been obtained pure, is of great power as a stimulant. In corroboration, I would mention my having produced vesication merely by rubbing the stem of the *Arum Walteri* (a South Carolina species) in contact with the unbroken skin; and I observe that both species are very irritating to the fauces. By chemical analysis (Am. Journal Pharm. xv, 83) it contains, besides the acrid principle, from ten to seventeen per cent. of starch, which may be obtained from it as white and as delicate as from the potato; also albumen, gum, sugar, extractive, lignin, and salts of potassa and lime. Bigelow states (i, 59) that the starch is prepared by pouring repeatedly portions of water over the fresh root reduced to a pulp by grating, and placed on a strainer, the farinaceous part being carried through, and leaving the fibrous behind. Dr. McCall, of Georgia, found it to yield one-fourth part its weight of pure amylaceous matter, which is white, delicate and nutritive. See, also, the experiments of Bigelow to extract the acrimonious principle of the fresh root. The root may be preserved if kept buried in the sand. Dose of recently dried root, ten grains mixed with gum-arabic, sugar and water, in the form of emulsion, repeated and increased.

During scarcity of food almost any substance that contains starch, even though it be associated with bitter or noxious principles, may furnish material for bread. "From the acorn

a kind of meal is produced which makes excellent bread, provided that a little barley meal be mingled with it to counteract its astringent qualities. M. Parmentier extracted the farina or starch of the bryony, the iris, gladiolus, ranunculus, fumaria, arum, dracunculus, mandragora, colchicum, filipendula and hellebores, etc. It is only necessary to cleanse these roots, to scrape and pound them, and then to soak the pulp in a considerable quantity of water; a white sediment is deposited, which when washed and dried is a real starch. M. Parmentier converted these different starches into bread by mingling them with an equal portion of potatoes reduced into the pulp, and the ordinary dose of wheaten leaven; the bread had no bad taste, and its quality was excellent." Wilson's Rural Cyc. We have in the Southern States several species of the genera mentioned above. See index to this volume; also, "*Zizania*," or Canada rice. A knowledge of these plants may prove serviceable in case of an emergency.

Peltandra Virginica, Raf. (Kunth, En. Pl.) *Arum Virginicum*, L. Common in swamps; collected in St. John's; vicinity of Charleston. Fl. May.

Stearns' Am. Herbal. 133. Property probably similar to those of the above. "Powerfully stimulant, diuretic and diaphoretic. Stimulates the solids, promotes the secretion of perspiration, urine, etc.; good in languid, phlegmonous habits, in relaxation and weakness of the stomach, loss of appetite, in jaundice, hysterical and hypochondriacal complaints, rheumatism, pains and obstinate headaches unattended with fever." Dose, ten grains, with sixty grains of gum-arabic, twenty of spermaceti, and eight of sugar. The corm is esculent when cooked.

Arum maculatum. I find that this species is not a native of the Southern States; but the indigenous *A. triphyllum* is said to possess precisely the same properties; so I will allow it to remain.

Bull. Plantes Vén. de France 83. "The leaves, being eaten by three children, produced horrible convulsions," swelling of the tongue, etc. One author mentions that he uses the root with great success in rheumatic pains, in doses of six to twenty grains of the fresh root, three times a day. The emulsion is more sedative. The dry root is quite nutritious, serving as an

article of food. Catalogus Plantarum, 28. The decoction of the root with honey is a powerful expectorant, and is useful in asthma. (*Expectorat enim validissime crassas lentasque excreationes.*) The Catalogus Plantarum of Ray, furthermore, expresses this high opinion: "*Remedium est præstantissimum et minime fallax adversus venenum et pestem, asthmaticos maxime juvat, hernias curat et urinam ciet.*" See, also, the Historia Plantarium Raii, p. 1208. The root, dried and powdered, has been sold as a cosmetic, under the name of cypress powder; said, also, to possess a soporific quality, and to be used in washing linen. Linn. Veg. Mat. Med. 168; Woodv. Med. Bot. 75. The recent root, according to Orfila, will cause the death of a dog in thirty-six hours. Toxicol. 298; Ancien. Journal de Méd. xxxiv, 529. See Dict. des Drogues, i, 355, for chemical analysis. Portland sago is made from the root. Encycl. Plants, 800. The bad effects resulting from the use of the *Arum* are alleviated by the administration of buttermilk and oily liquors. Shecut, in his Flora Carol., speaks of its great reputation as an effectual remedy in cachectic cases, in weakness of stomach, and fixed rheumatic pains. The fresh root, externally applied, is a good substitute for Spanish flies. Dr. Lewis, in the Fam. Herbal. 751, asserts that neither water nor spirit extracts its virtues, the fresh root being best administered in substance in the form of a bolus or emulsion, or by beating it up with resin or gum, and keeping in pill. Geoffroi alludes to it as a valuable stomachic for restoring lost appetite; useful in chlorosis, jaundice and hysterical affections. He says that by boiling the root in vinegar it becomes powerfully diuretic. Bergius reports the root as of great service, mixed with an alkaline aromatic, in cases of obstinate periodical headache, when the pulse is slower than natural without fever. Journal de Pharm. xii, 158. Mérat, in the Dict. de Mat. Méd., endorses the opinions generally expressed above. U. S. Disp. 123; Big. Am. Med. Bot. i, 52. Sir J. E. Smith, in his Introd. to Botany, says that it is asserted by ——— that at the period of inflorescence, between 4 and 10 o'clock, P. M., the flower is actually "hot," causing the thermometer to rise several degrees.

SKUNK CABBAGE; POLE CAT WEED, (*Symplocarpus fœtidus, Dracontium fœtidum.*) *Pothos* of Mx.

A fetid plant, the root and seed supposed to possess some

anti-spasmodic and narcotic power. It has been employed by Bigelow and Heintzelman and others in hooping cough, catarrhs, phthisis, hysteria and dropsy. The Rev. Dr. Culter introduced it into notice, and employed it in asthma. N. J. Med. Rep. 410; U. S. Disp. The root, chewed, produces a prickling sensation in the mouth. The leaves are used to dress blisters to keep up a discharge. The roots occasion vomiting and dimness of sight. Bigelow; Griffith. Dose of powdered root, ten to twenty grains, repeated. The seeds contain 20 per cent. of fixed oil, which is acrid. Am. Jour. Pharm. ii, 1. A strong infusion of the plant is also used.

GOLDEN-CLUB, (*Orontium aquaticum*, Mx.) Roots often immersed; common in lower country; collected in St. John's. Fl. May.

Lind. Nat. Syst. 365. "The root is acrid, but becomes eatable by roasting." Both the seeds and roots were eaten by the Indians. The stem just beneath the infloresence is of the most beautiful white; a section of it I have observed to be admirably suited for microscopical inspection.

TYPHACEÆ. (*The Bulrush Tribe.*)

CAT-TAIL; REED MACE, (*Typha latifolia*, L.) Morasses and stagnant waters, often immersed; collected in St. John's; vicinity of Charleston; Newbern.

Mér. and de L. Dict. de M. Méd. t. vi, 795; Journal de Chim. Méd. iv, 179; Journal de Pharm. xii, 564. This plant receives an extended notice in European works. The root is eaten as a salad. See, also, Lightfoot's Fl. Scotica, ii, 339. A jelly also is extracted from it. Aublet assures us it is good in gonorrhœa and chronic dysentery. See an analysis in Journal de Pharm. xii, 564, and xiv, 221. Little crystals of phosphate of lime are found in the stems. It is said also to be abundant in fecula. Découv. des Russes. iii, 450; Gmèlin, Flora Siberica, i, 25–139. See Vignal's Essay on the treatment of wounds with the pollen or aigrettes of the *Typha*, which it is proposed to use a substitute for cotton, (in French.) Paris, 1803. The bark has been employed in the fabrication of hats, and with cotton in making gloves; and some have recommended it in making China paper. See the Dict. de M. Méd. "Paper made from the swamp flag,

called cat-tails, was manufactured in 1863 upon an extensive scale in New York. This product appears to be well adapted for card boards and paper-hangings." The down has been used to stuff mattresses. Linnæus informs us that the coopers in Sweden employ the stalks to bind their casks with. In England they use the *Scirpus lacustris*, and in Italy the *Carex acuta*, (all Southern species, which see,) to fasten the timber in the joints. The stalks are opened longitudinally, and placed between the interstices, so as effectually to prevent the escape of fluids. Those who manufacture turpentine and rice barrels might find these plants of much service in this respect—serving the purpose much better than the strips of wood shaving generally employed to render the seams tighter. I would invite further attention to the *Typha* for the several purposes alluded to.

"ESPARTO" GRASS.

This Grass, which is being grown in Spain, Portugal and the French Algerian Colonies, is attracting great attention as a material for making paper. It requires a warm, dry climate, and it is proposed to raise it at the South where it seems that every element is favorable to the success of the enterprise. It is quite as easily cultivated as rice or hay, and it yields much larger returns—as it readily brings in market seventy dollars of our currency per ton.

I insert the following communication from a gentleman in Charleston who is thoroughly acquainted with the wants of the paper manufacturer, and with everything which relates to printing and book-making:

"*A New Crop for our Rice Fields.*—The Esparto grass of which we speak is already the successful rival of rags, as a material for the manufacture of paper. The production of the grass has increased with great rapidity, and it is now consumed to the value of about one million of dollars monthly on the continent and in Great Britain. New mills are being erected and fitted with machinery exclusively adapted to its use, while old mills are changing their machinery for the same purpose. There is no doubt that its general adoption is but a question of time.

"In the United States the Esparto grass is as yet unknown; but the high price of rags and the failure of almost all

materials—except, perhaps, maple wood—used in their stead for the manufacture of paper, which has now become one of the leading commercial interests of the world, will soon induce our Northern paper manufacturers to try this new material.

"The writer has not only seen the Esparto taken from the bale and put through all the processes of manufacture into fine printing and writing papers, but he has also seen the grass growing, and is confident that our climate and soil will produce it at least as well as the countries in which it is now cultivated.

"The Esparto grass yields to the paper-maker nearly as much pulp as average rags yield. It is no more difficult than rags to work up, and in many respects, although not in all, it is to be preferred to them.

"Thus, after two hundred years of experiment and the trial of a thousand different substances, just when the civilized world feels its necessity the most, a perfect substitute for rags has been found, and will be used wherever a book is read and the art of writing known.

"We have now some samples of the Esparto seed and of pulp made from it."

The okra stalk has also been attracting attention as a material for paper. An Alabama Manufacturing Company has for some time been engaged in experimenting in its use, and with eminently srtisfactory results, (1869.) It is claimed that the okra can be bleached to any degree of whiteness; that the cost of reducing it to "half stuff" and pulp, will not, on a considerable scale, be greater than the cost of converting rags into pulp, and that the okra paper is as soft as rag paper, and almost as much so as that made from pure linen—thus combining in one material a great desideratum in paper-making—flexibility and strength. The okra may also be used as "hard stock," to give strength to any other material. The seed may also be made use of. A large dealer in paper informs me that he considers it probably one of the best materials at our disposal for the purposes proposed.

BURR-REED, (*Sparganium ramosum*, Huds. *S. Americanum*, Ell.) Lagoons and ditches; Florida and northward.

The herbage of the branchy species of Burr-reed (*Sparganium*) is softer and more pliant than that of the reedy plants, and serves well in combination with some of them in packing. I

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have been surprised that more use is not made of such plants by merchants and packers. The unripe burrs are very astringent; a strong decoction is employed for various purposes as an astringent. See Darlington's Flora Cestrica.

ACORACÆ.

SWEET-FLAG; CALAMUS, (*Acorus calamus*, L.) Diffused in bogs and morasses; I have collected it in Fairfield and in Charleston Districts; vicinity of Charleston; Newbern.

Le. Mat. Med. i, 251; Pe. Mat. Med. and Therap. ii, 76; Royle, Mat. Med. 602; Hoffmann's Obs. Phys. Chim. i, obs. i; Ell. Bot. Notes, i, 403; U. S. Disp. 145; Ed. and Vav. Mat. Méd. 281; Ball. and Gar. Mat. Med. 431; Bergii, Mat. Med. 287; Mér. and de L. Dict. de M. Méd. i, 63; Woodv. Med. Bot.; Ann. de Chim. lxxxi, 332; Coxe, Am. Disp. 18; Shec. Flora Carol. 96. This is a very pleasant, aromatic stimulant and stomachic; esteemed as a stimulating tonic in atonic conditions of the stomach and bowels; in the East as a powerful aphrodisiac and carminative. Ed. and Vav. state that it has been administered successfully in intermittent fever: "On l'a beaucoup vante pour combattre les symptomes cérébraux qui accompagnent la seconde période des fièvres dites ataxiques." Heberden, in his "Commentaries," page 149, says that when bark fails in the cure of intermittent fever, he gives a scruple of chamomile flowers powdered. "I have also given," he adds "two scruples of calamus aromaticus in some extraordinary cases, and have found it more efficacious than a variety of other means." Dr. Thompson says, from his own experience, he finds it one of the most useful adjuvants to bark and quinine; given also, combined with magnesia, in the flatulent colics of infants. In the Supplem, to Mér. and de L. 1846, 10, Dr. Endelicher assures us that the root is an excellent remedy in chronic gout: "qu'elle apaise les douleurs, qu'elle assouplit les articulations"—administered in powder, from eighteen to twenty grains every two hours. Annal. de Méd. and note, sur quelques plantes de l'Aube, Mém. de l'Aube, 1841. The fresh root, candied, is said to have been employed in large quantities as a preservative in epidemic diseases. Thornton's Fam. Herb. 354. The root is used in vertigo. Linn. Veg. M. Med. 64; Griffith Med. Bot. 620. See Anal. by Trommsdorf; Ann. Clinique, xvii. From which it ap-

pears to contain volatile oil, resin, extractive, etc. Thompson, in his M. Med., says that the oil differs from other volatile oils in not dissolving iodine.

The root of this powerful aromatic plant is much used as a flavoring substance throughout the Western States for making bitters, particularly the compound tincture of gentian. See treatises on the Mat. Med. "It is a principal medicament in the preparation of the medicated malt liquors called herb ales, and is supposed to be the ingredient used by the French for giving flavor to their snuff called *à la violette*. The whole plant has been used for tanning leather, and in Poland it is strewed on the floors of the upper and middle classes of society when they are about to receive company, in order that the leaves may be bruised by the feet of the guests, and fill the rooms with an agreeable odor." Rural Cyclopœdia, p. 40. The dose of the root is from ten to twenty grains. An infusion of the root is made with one ounce to one pint of boiling water; dose, a wineglassful.

NAIADACEÆ. (*The Pond-weed Tribe.*)

ALOA; EEL-GRASS, (*Zostera marina*, L.) West Florida and northward; deep salt water coves. Chapman. Not in any catalogue of the plants in St. John's, S. C.

This marine herb or sea-grass, with creeping stems, is just attracting great attention in England (1862) as a substitute for cotton. The result is doubtful, as the amount to be obtained is perhaps inadequate. The papers are filled with accounts of the plant. It is not a sea-weed though it "grows at the bottom of the sea;" it produces a large quantity of fibre in proportien to its bulk, which is strong, elastic and silky—used by upholsterers as a material for bed stuffing, and also successfully applied in the manufacture of paper. See "Asclepias" and "Ramie."

Substitutes for Cotton.—The London Index says:

Some new "substitute for cotton," which is to cost nothing, to make the fortune of the inventor, and to reopen the mills of Lancashire, is discovered every week. The inventors are mostly persons who know nothing of cotton spinning, and they forget, invariably, that a material which costs nothing when supposed to be useless and gathered by handsful might become almost as

dear as silk if there were a manufacturing demand for hundreds of millions of pounds weight of it. The following remarks by a "Medallist in Botany," deserve notice:

"I have obtained samples of most of the fibres proposed, and I have submitted them to careful examination under the microscope. I find them all to be varieties of woody fibre, more or less split up or divided, varying in the length and thickness of the fibrillæ. The fibres of all the specimens I have seen are, nevertheless, uniform in the following particulars: they are all solid and inelastic or brittle, with joints and rough edges, showing where the bundles of fibrillæ have been torn apart. Having some practical acquaintance with cotton spinning and weaving, I assert that the above qualities render woody fibre unfitted to be used as a substitute for cotton without a considerable modification of our machinery. The fibres which have been exhibited may probably be useful as substitutes for linen, if they can be largely produced at a cheap rate; but the woody fibre (from which all the proposed substitutes, I feel confident, are drawn) can never be a perfect substitute for cotton, which consists of vegetable hairs, hollow, elastic, ribbon shaped and spiral, with smooth edges and surfaces. If we want a substitute for cotton we must not look for it in woody fibre."

PISTIACEÆ. (*The Dutchweed Tribe.*)

WATER FLAXSEED, (*Spirodelia polyrrhiza*, Schleid. in Kunth's En. Pl. *Lemna polyrrhiza*, W. and Ell. Sk.) Santee Canal. Fl. July.

Lightfoot's Fl. Scotica, ii, 538. The "leaves sink to the bottom of the water in winter and rise in the spring." The *Lemna* or duckweed destroy fish by covering so closely the surface of ponds as to exclude the air.

GRAMINACEÆ. (*The Grass Tribe.*)

Well known for their great value for many purposes.

MAIZE; INDIAN CORN, (*Zea Mays.*)

The methods of cultivating this staple article of food are so widely known that I feel absolved from the necessity of enter-

ing very fully upon their relation in this place, but will insert the following plan pursued by David Dickson, the well known agriculturist of Hancock Co. Ga., (see his letters in So. Cultivator, Jan., 1869.) It is certainly marked by great common sense:

First, drain the wet land, then deepen your soil; charge it well with vegetable matter, either by rest or sowing oats and feeding off in the field, sowing and turning under pea vines, (Cow pea,) or clover and other grasses, where they will succeed, etc. Then plow deep and sub-soil to the extent of your ability. Gather all the manure possible from previous crops, cotton seed, manure from stock, leaves, pine straw and mud, and other scrapings; then add each year to each crop, corn, oats, cotton, wheat, etc., such *soluble* ammonia and bone, earth, etc., as Peruvian Guano and Dissolved Bones, Land Plaster, Salt and Wood Ashes, (see his Formula under "Cotton" in this volume,) may have in them—the latter, if to be used in any form, at a price that would warrant its use.

Plant corn eight inches below a level, put the manure within three or four inches of the seed, and cover about one and a half inches deep. Cultivate shallow—first, plowing one and a half inches deep; second, one-third; and third, in half inch. I prefer a heavy, sharp sweep, twenty-two to twenty-six inches wide, either for corn or cotton. If you carry out this plan well as to time it will never fail. * * If you wish a cotton plant or a corn-stalk to stand a hot burning sun, and a dry northwest wind from four to ten weeks and come out safely, you must water and put in sufficient soluble food to last. How is that to be done? By deepening the soil, plowing deep, subsoiling and filling it with humus, that it may retain the greatest amount of water. * * I do not care what color the land is, or whether sand or clay, if you keep up a *full supply of vegetable mold*, break deep before planting and cultivate lightly afterwards, [by this means the roots of the corn are not cut.] the result will be good, wet or dry.

In Mr. Dickson's letter, dated Sparta, January 6th, 1868, he says:

Have good turning plows, and according to your ability, use one or two horses, and sub-soil; ride over the field, and lay off the land so that the horses will go round on a level, and the

dirt will fall *down hill*—a team will break up the soil nine inches deep in this way, as easily as they could seven inches, on a level piece of land. Continue to take the lands in the same way until the field is finished, one team following another—all the time going round the circle; and if you sub-soil, have one team between each turning plow, running in the bottom of the furrow. When you finish, the field is ready for planting, if the proper time has arrived. In deciding this point, you must be governed by the weather—it varies from the tenth of March to the first of April. According to my experience, a man only gains hard work and more of it, by very early planting.

Now for the planting. Lay off furrows with a long shovel plow, on a level, seven feet apart. Commence at the opposite end, with a longer shovel, and open out the same furrow. The reason for this is, you get up to trees and stumps, and make a better finish at the ends. This furrow should stand open seven or eight inches deep. Whether you use compost, cotton seed or guanos, let each hand have his three foot measure, and deposit the manure in the bottom of the furrow, just three feet apart. Then drop the corn within three or four inches of the manure one or more grains, as is your custom—dropping on the near side of the manure, as the dropper goes; then, with a very light harrow, cover the corn one or one and a half inches deep. The harrow should go the same way the dropper goes, to keep from pulling the manure on the grain.

If you cover deep, you lose all the advantages of low planting, (but not the deep breaking,) and for this reason: corn, in good weather, will come up from a depth of one to six inches, but will strike out roots about one inch from the surface of the ground, and all below that will perish. That is one reason why I am opposed to dirting corn as soon as it comes up—it brings the root of the stalk to the top of the ground.

My plan is to finish the first working from the 20th of April to the 10th of May. Sometimes I have not finished before the 25th of May. With the land well turned, very little grass and weeds will come up, except in the bottom of the furrow, and this is easily managed.

For first plowing, have a heavy twenty-two inch sweep, with the right wing so set, that its back end will not be more than one inch above the ground. This is to run near the corn, and

should fill the furrow within one or one and a half inches of the general surface. Break out the middles with the same sized sweep, with the back of both wings turned up; if the plowing is well done, four furrows will finish out—four hands completing fourteen acres every day, by going sixteen miles a day.

Second plowing—have the wing of the siding sweep turned a little more than half up; run close to the corn, leaving nothing for the hoe; for if the plowing is well done, there is no use of a hoe. Break out the middles with three furrows, to make a good place to plant peas. From the first of June to the 20th is a good time to plant peas. Proceed in this manner. After the second plowing, run a shovel furrow in the middle of a corn row; drop one bushel of peas to every eight acres—say six to eight peas to a hill. You can plant sixteen acres per day, and will use two bushels to each plow—cover with a harrow.

Third and last plowing—pair your hands, one to side the corn and one to side the peas; the hand that sides the corn will need a twenty-two inch sweep, right-hand wing well up, and it should run close to the corn—not going more than a half inch deep; the left wing should be nearly flat. The hand that sides the peas, will need a heavy twenty-six inch sweep, with the right wing set at medium height, and should run it near the peas, and fill the pea furrow entirely up; the left wing should be up, to push the dirt near the corn. This is the last plowing, and if well done, the ground will be as smooth and level as a floor, with not a spear of grass to the two hundred acres, nor a weed to be seen in the field. In old times, I required every hand to clean the crop as he went—what the plow left, to be removed with the foot and hand. From thirteen to sixteen miles, according to the condition of the crop, was a day's work.

Such pine land as mine, (some of it very poor,) should average twenty to twenty-five bushels per acre; and wet or dry, if the work is rightly done, there is no such thing as a failure, as my many visitors, from all parts of the country, will testify.

The Ergot of Maize, according to M. Roulin, is very common in Columbia, and the use of it is attended with a shedding of the hair, and even the teeth of both man and beasts. Mules fed on it lose their hoofs, and fowls lay eggs without shells. Its action on the uterus is as powerful as that of the Rye ergot, or perhaps more so. Ann. des Sc. 19, 279. Lindley. Prof.

Wood, U. S. Disp., 12th Ed., states that Mr. C. H. Cresler had examined the growth on Indian corn known as Smut, and it was found to contain the alkaloid discovered by Winckler in ergot and named by him *seculin*, now considered as a mere synonyme of *propylamia*. Besides the alkaloid, there were obtained a thick, viscid, fixed oil, a resin soluble in ether but not in alcohol, pectin, gluten and a species of sugar. The morbid product may, therefore, be considered as the *ergot of maize*. (Am. J. Pharm., July, 1861, p. 306.) The fungus has received the title of *Ustilago Maidis*. It is said, adds Prof. Wood, to produce abortion in cows when the diseased grain is eaten by them; and six drachms of this ergot produced the same effect on the pregnant bitches to which it was given to test its abortifacient property. (Am. J. Pharm., Sept., 1861, from Annal. Med. Vet. Belge.)

Corn is certainly one of the most nutritious of the cerealia with which man has been blessed. In one hundred pounds of corn there are ten of oil; the grain and meal are prepared in a great variety of ways, and the whole plant adapted to many useful purposes in the arts, in medicine, and in domestic economy. The article *Zea*, in the Rural Cyc., is full of information compiled from numerous authorities. The author refers to the manufacture of coarse paper from the husks. Blade tea is quite a favorite diaphoretic used recently by many in the Southern States in fever—its anti-periodic properties doubtful. The use of corn meal to form an emollient poultice, and for conveying and retaining heat to the surface of the skin, is well known. Corn meal rubbed into fresh meat will preserve it fresh several days during hot weather; a light covering with bran or a series of dustings with oatmeal will be equally efficient—methods so easily put in practice that a knowledge of them may prove serviceable in times of difficulty.

In the Patent Office Reports, 1855, p. 158, there is a communication on "Bread crops," on the value and use of the maize as an article of food, on its preparation for bread in place of wheat flour, and on the economy of mixing rye with corn. It is stated from a foreign report that a "bread composed of two-thirds rye and one-third maize, is about ten per cent. cheaper than bread made of pure rye." A method is given to prevent the souring of maize flour. In our armies during the recent

war it was a universal subject of complaint that corn meal, or flour, was not given to the soldiers in place of wheat, as it is nutritious and much more easily and better cooked. Besides, Southerners are, for the most part, more accustomed to corn bread.

The "Boston Brown Bread," a useful hygienic preparation, contains two parts of corn to one of rye meal, and is made in the following manner: "To three quarts of mixed meal are added a gill of molasses, two teaspoonsful of salt, one teaspoonful of saleratus, and either a tea cupful of home-brewed or half a tea cupful of brewer's yeast. This bread continues good and wholesome as long as any other bread is usually kept; but like other preparations of corn it is preferred warm, and is generally eaten fresh, or after being toasted. Like all other kinds of corn bread it is an acceptable substitute not only for the bread made of other grains but for the vegetables which use has made desirable at the noonday meal."

Corn fecula, an admirable substitute for arrowroot, for table use, much cheaper and equally free, says Parrish, from unpleasant odor and taste, is largely manufactured. It is also much sold in England under the name of Oswego Starch. Prepared corn is an excellent food for children.

A chemical analysis of the corn-cobs is given by Prof. C. T. Jackson, volume Patent Office Reports, 1855, p. 163, and a paper on green corn for fodder, p. 168. It may be planted as a substitute for Northern hay. "The amount of green food which may thus be grown under favorable circumstances seems almost incredible. An acre contains forty-three thousand five hundred and sixty square feet; if, therefore, but one such stalk were to grow upon each foot, there would be over seventy-six tons produced to the acre." The Northern varieties are recommended to be planted at the South for this purpose. Land that will produce two tons of hay will yield, it is supposed, ten tons of corn fodder for leaves, roots, etc., suitable for man and horse in periods of scarcity. See "*Alopecurus*" and "*Anthoxanthum*" in this volume.

Mr. J. H. Salisbury, in a prize essay published by the New York State Agricultural Society, and quoted in Norton's Elements of Practical Agriculture, states that there is in the cob of this grain two per cent. of gluten and gum, and one or two per

cent. of sugar, with a little starch. It has, therefore, some importance of its own as food. In Patent Office Reports, 1848, p. 355, it is stated in a report from Richmond, Massachusetts, that "corn-stalks, well secured and cut fine, furnish an agreeable and healthy food for horses and neat cattle: for the latter, if when cut they are scalded by pouring on warm water, they are almost equal to what they are when green, especially for cows, causing them to produce milk of almost the richness of June. They are worth, when well cured, six dollars per ton, when hay is worth ten dollars; straw is worth from four dollars and fifty cents to five dollars per ton. Large quantities of straw are annually manufactured into paper, and the demand for this purpose probably increases its price some fifteen or twenty per cent."

On the subject of general economy, in absence of supply of Northern hay, I introduce the following in an article on corn-stalks for fodder, by a correspondent of the Country Gentleman, 1861. It is advised to be cured, cut up entire, and fed to cattle. The Editor of the Southern Field and Fireside says: "For the last six years, while residing on a farm in Georgia, we have followed the Northern plan of cutting up corn near the ground, curing the stalks and corn in shocks, then husking or shucking the corn, and feeding the stalks and blades together. This we regard as much better economy than to pull fodder and leave the whole stalks in the field. If we had many cattle to feed, we should procure a machine for cutting the stalks, steam them a little, and add a little meal of some kind. We have fed dairy cows in this way with satisfactory results. Good clover hay is worth more than any corn fodder for cows and horses, pound for pound." See, also, same paper, May 4, 1861, for article on cultivation of hay. Corn-stalks are also very useful as manure, when composited with a little caustic lime, as it is a plant-food of considerable value. "Dr. Spengle found eighty-eight pounds of ashes in one thousand pounds of corn-stalks. Corn-cobs are rich in potash, and yet one often sees them wasted in wood-lots or the highway." The cob yields almost as much ashes as the tobacco plant.

A writer in the Richmond Examiner, 1862, from Fluvanna County, communicates the following substitute for *Soda:* "To the ashes of corn-cobs add a little boiling water; after allowing

it to stand for a few minutes, pour off the lye, which can be used at once with an acid, (sour milk or vinegar.) It makes the bread almost as light as soda." I have seen this preparation made and used at the South during the war. It is, strictly speaking, a potash mixture, has precisely the taste of a strong solution of bi-carbonate of potash, and could be used in cough mixtures to correct acidity, and wherever an alkaline solution is required. The bread made with it is excellent. It would also serve the purposes of "concentrated lye." For manufacture of *soda*, see "*Salsola kali.*"

An economical mode of making *Soap* with corn shucks, which a correspondent in the Southern Field and Fireside, March 8, 1862, says "has been tried and approved by several persons," I insert as follows: "Take one gallon of strong lye, add a half pound of shucks, cut up fine. Let the shucks boil in the lye until they are reduced to shreds. Then fish the shreds out, and put half a pound of crackling grease in, or six ounces of lard, and boil until it is sufficiently thick to make good soap." The amount of potash in the blade and shuck of corn observed in the table I have inserted from Ure's Dictionary may explain the value of this substance. I am informed that soap has been made satisfactorily from the corn shuck, as above described.

I insert the following, believing that the ashes of the corn-cob, on account of the potash it contains, would serve in place of those from hickory:

Preserving Meat.—Ashes prepared from green hickory wood, combined with salt in the proportion of one-third to two-thirds by measurement, and applied in the ordinary way of salting meat, in ordinary quantity, will save pork fully as well as salt alone, and give a delicacy of flavor to bacon made from it which saltpetre or sugar pickle will not impart. Mix the ashes and salt thoroughly, in the above proportions, and use the mixture as salt alone is commonly used. No one need hesitate to rely on it.

Beer may be made from corn thus: "Take one pint of corn and boil it until it is soft, add to it a pint of molasses and one gallon of water; shake them well together and set it by the fire, and in twenty-four hours the beer will be excellent. When all the beer of the jug is used add more molasses and water. The same corn will answer for months, and the beer will be fit

for use in twelve hours by keeping the jug where it is warm. In this way the ingredients used in making a gallon of beer will not cost over six cents, and it is better and more wholesome than cider. A little yeast greatly forwards the working of the beer." To make *Small Beer:* "Nine quarts of water, three pints of bran, and a few hops; strain and cool to milk-warm, then put in a few raisins, one pint of molasses, let them stand one night and strain and bottle it."

A Substitute for Coffee was recommended as follows during the period of scarcity: For a family of seven or eight persons, take a pint of well toasted corn meal and add to it as much water as an ordinary sized coffee pot will hold, and then boil it well. We have tried this toasted meal coffee, and prefer it. Many persons cannot drink coffee with impunity, and we advise all such to try the receipt. They will find it more nutritious than coffee, and quite as palatable." See rice (*Oryza sativa*) and "okra" (*Hibiscus esculentus*) for their uses as substitutes for coffee.

The journals continued to report as long as the war lasted that "blade tea is excellent in fevers," and that "*raw corn meal*, mixed with water to drink, removes superfluous bile and cures fever!" "Green corn and wheat makes useful starch, and rice starch gives lawns and colored articles a look of newness unsurpassed."

Oil of a fine quality is manufactured from corn. "It is said to burn with a clear, steady light, in every respect equal to sperm or lard oil, without the smoke which usually attends vegetable oils, and will not congeal in the coldest weather." A liquor, well known as corn Whiskey, is also distilled from the fermented grain.

Thäer says "the use of unripe maize for the manufacture of *Sugar* has lately been again recommended, on the ground that maize is better adapted for this purpose than beet root. I have long been of opinion that of all plants which can be raised in this country, maize is better suited to the purpose in question; the syrup extracted from it is before crystallization decidedly superior to that of the best sort." Principles of Agriculture, p. 485. In the Southern States where the sugar-canes have been so generally introduced the problem may be differently solved. As it may become a matter of great interest, I insert the following:

Corn Sugar.—Extracts from the remarks on the mode of manufacture, by Wm. Webb, of Wilmington, Delaware, May, 1862:

The raw juice of maize, when cultivated for sugar, marks 10° on the saccharometer, while the average of cane juice (as I am informed) is not higher than 8°, and beet juice not over 3°. From nine and three-quarter quarts (dry measure) of the former I have obtained four pounds six ounces of syrup concentrated to the point suitable for crystallization. The proportion of crystallizable sugar appears to be larger than is obtained from cane juice in Louisiana. This is accounted for by the fact that our climate ripens corn perfectly, while it but rarely, if ever, happens that cane is fully matured. In some cases the syrup has crystallized so completely that less than one-sixth part of molasses remained. This, however, only happened after it had stood one to two months. There is reason to believe that if the plant were fully ripe, and the process of manufacture perfectly performed, the syrup might be entirely crystallized without forming any molasses. Without any other means for pressing out the juice than a small hand mill, it is impossible to say how great a quantity of sugar may be produced on an acre; but the calculations made from trials on a small scale leave no room to doubt the quantity of sugar will be from eight hundred to one thousand pounds.

I have been informed by Mr. Ellsworth that M. Pallas, of France, had discovered in 1839 that the saccharine properties of maize were increased by merely taking off the ear in its embryo state. An experiment, however, which I instituted to determine the value of this plan resulted in disappointment. The quantity of sugar produced was not large enough to render it an object. The reasons of this failure will be sufficiently obvious on stating the circumstances. It was found that taking the ear off a large stalk, such as is produced by the common mode of cultivation, inflicted a considerable wound upon the plant, which injured its health, and of course lessened its productive power. It was also found that the natural disposition to form grain was so strong that several successive ears were thrown out, by which labor was increased and the injuries to the plant multiplied. Lastly, it appeared that the juice yielded from those plants contained a considerable portion of a foreign

substance not favorable to the object in view. Yet, under all these disadvantages, from one hundred to two hundred pounds of sugar per acre may be obtained. The manifest objections detailed above suggested another mode of cultivation, to be employed in combination with the one first proposed. It consists simply in raising a greater number of plants on the same space of ground. By this plan all the unfavorable results above mentioned were obviated, a much larger quantity of sugar was produced, and of a better quality. The juice produced by this mode of cultivation is remarkably pure and agreeable to the taste. The sweetness of the corn-stalk is a matter of universal observation. Our forefathers in the Revolutionary struggle resorted to it as a means to furnish a substitute for West India sugar. They expressed the juice and exerted their ingenuity in efforts to bring it to a crystallized state; but we have no account of any successful operation of the kind. In fact, the bitter and nauseous properties contained in the joints of large stalks render the whole amount of juice from them fit only to produce an inferior kind of molasses. I found on experiment that by cutting out the joints, and crushing the remaining part of the stalk, sugar might be made, but still of an inferior quality. The molasses, of which there was a large proportion, was bitter and disagreeable.

From one to two feet of the lower part of these stalks was full of juice, but the balance, as it approached the top, became dryer and afforded but little. From the foregoing experiments we see that in order to obtain the purest juice and the greatest quantity we must adopt a mode of cultivation which will prevent the large and luxuriant growth of the stalk. The planting should be done with a drilling machine. One man, with a pair of horses and an instrument of this kind, will plant and cover in the most perfect manner from ten to twelve acres in a day; the rows, if practicable, let them run north and south, two and a half feet apart, and the seed dropped sufficiently thick in the row to insure a plant every two or three inches. A large harrow, made with teeth arranged so as not to injure the corn, may be used with advantage soon after it is up. The after culture is performed with a cultivator, and here will be perceived one of the great advantages of drilling; the plants all growing in lines, perfectly regular and straight with each other, the horse-

shoe stirs the earth and cuts the weeds close by every one, so that no hand-hoeing will be required in any part of the cultivation. It is a part of the system of cane-planting in Louisiana to raise as full a stand of cane upon the ground as possible, experience having proved that the most sugar is obtained from the land in this way. As far as my experience has gone, the same thing is true of corn.

The next operation is taking off the ears. Many stalks will not produce any; but whenever they appear they must be removed. Any time before the formation of grain upon them will be soon enough. Nothing further is necessary to be done until the crop is ready to be cut for grinding. The stalks should be topped and bladed while standing in the field. They are then cut, tied in bundles and taken to the mill. The mills used for grinding the Chinese sugar-cane will answer every purpose. The tops and blades when properly cured make an excellent fodder.

On the whole, there appears ample encouragement for perseverance. Every step in the investigation has increased the probability of success, no evidence having been discovered why it should not succeed as well if not better on a large scale than it has done on a small one.

1. In the first place it has been satisfactorily proved that sugar of an excellent quality, suitable for common use without refining, may be made from the stalks of maize.

2. That the juice of this plant, when cultivated in a certain manner, contains saccharine matter remarkably free from foreign substances.

3. The quantity of this juice (even supposing we had no other evidence about it) is sufficiently demonstrated by the great amount of nutritive grain which it produces in the natural course of vegetation. It is needless to expatiate on the vast advantages which would result from the introduction of this manufacture into our country.

The process which has been employed in the manufacture of maize sugar, is as follows: the juice, after coming from the mill, stood for a short time to deposit some of its coarser impurities. It was then poured off, and passed through a flannel strainer, in order to get rid of such matter as could be separated in this way. Lime water, called milk of lime, was then

added, in the proportion of one or two tablespoonsful to the gallon. It is said by sugar manufacturers that knowledge on this point can only be acquired by experience; but I have never failed in making sugar from employing too much or too little of the lime. A certain portion of this substance, however, is undoubtedly necessary, and more or less than this will be injurious, but no precise directions can be given about it. The juice was then placed over the fire and brought nearly to the boiling point, when it was carefully skimmed, taking care to complete this operation before ebullition commenced. It was then boiled down rapidly, removing the scum as it rose. The juice was examined from time to time, and if there was any appearance of feculent particles which would not rise to the surface, it was again passed through a flannel strainer. In judging when the syrup is sufficiently boiled a portion was taken between the thumb and finger, and if when moderately cool a thread half an inch long could be drawn it was considered to be done, and poured into broad, shallow vessels to crystallize. In some cases crystallization commenced in twelve hours; in others not till after several days; and in no case was this process so far completed as to allow the sugar to be drained in less than three weeks from the time of boiling. The reason why so great a length of time was required I have not yet discovered. There is no doubt that an improved process of manufacture will cause it to granulate as quickly as any other.

The stripping the ears from the corn is esteemed by some essential in the production of sugar, though not in the production of a much smaller quantity of excellent molasses. The principal labor consists in stripping off the leaves, which should be done before the stalks are cut. Dr. Naudain, of Delaware, says (So. Cult. p. 26, vol. i) that the corn should be planted as broom corn is commonly planted—very close in the row, probably a stalk every four inches.

At a meeting of the French Academy M. Biot read the report of a committee, which paper contained the following statements: of the corn-stalks experimented upon the ears had been removed from one portion and left to grow on others. The juice obtained from the stalks which had been castrated yielded twelve per cent. of sugar; that expressed from the stalks on which the ears had been permitted to grow thirteen per cent.;

so that so far as France is concerned the results of former experiments may be fallacious. "The juice of maize contains as much if not a larger proportion of sugar than that of sugar-cane." Farmer's Encyc.

The reader interested will find the several numbers of Southern Cultivator, in vols. i, ii, iii and iv. See pp. 17, 19 and 25, and 90 of vol. i, a large number of papers on this subject. I regret that I can only refer to them. Hundreds of pounds of sugar were made by several persons. Six hundred to six thousand pounds can be made from one acre. It must be far easier to crystallize than that from sorghum. It has been advised to take off the tassel instead of the ear in order to increase the saccharine principle. Twenty-five gallons of juice make four gallons of syrup, and a gallon of juice will produce one and one-quarter pounds of sugar. The corn is not lost as fodder, and the salted refuse is also good. The boiling of the syrup should be commenced *immediately* after the corn is cut. The high price of sugar and molasses would add increased importance to this subject. I obtain the following from the Louisville Courier:

Paper.—The manufacture of Paper from the leaves of Indian corn is becoming extensive in Austria. The paper is said to be tougher than ordinary paper made from rags, while it is almost wholly free from silica, which makes paper produced from straw so brittle.

If the above be true it is a discovery of immense importance to the United States. We consume more paper than any other nation, and have Indian corn to make it of. If Indian corn paper be tougher than rag or straw paper it is just what we need, and our already monstrous corn crop, which in 1850 was 592,071,000 bushels to 100,485,000 bushels of wheat, and is mainly devoted to feeding our immense herds of live stock will be greatly extended, and paper go down in price.

Paper from Indian Corn Leaves.—The London Daily Telegraph gives the following account of Paper-making from Indian corn leaves, which promises to make a revolution in the paper business if only half is true that is stated, and we do not see any reason to doubt its correctness:

"Recent experiments have proved Indian corn to possess not only all the qualities necessary to make a good article, but to be

in many respects superior to rags. The discovery to which we allude is a complete success, and may be expected to exercise the greatest influence upon the price of paper. Indian corn, in countries of a certain degree of temperature, can be easily cultivated to a degree more than sufficient to satisfy the utmost demands of the paper market. Besides, as rags are likely to fall in price, owing to the extensive supply resulting from this new element, the world of writers and readers would seem to have a brighter future before it than the boldest fancy would have imagined a short time ago.

"This is not the first time that paper has been manufactured from the blade of Indian corn; but strange to say, the art was lost, and required to be discovered anew. As early as the seventeenth century an Indian corn paper manufactory was in full operation at the town of Rievi, in Italy, and enjoyed a world-wide reputation at the time; but with the death of its proprietor, it seems to have lapsed into oblivion. Attempts subsequently made to continue the manufacture were baffled by the difficulty of removing the flint, and resinous, and glutinous matter contained in the blade. The recovery of the process has at last been effected, and it is due to the cleverness of one Herr Moritz Diamant, a Jewish writing master in Austria, and the trial of his method on a grand scale, which was made at the Imperial manufactory of Schlogelmuhle, near Glognitz, Lower Austria, has completely demonstrated the certainty of the invention. Although the machinery, arranged as it was for the manufacture of rag paper, could not of course fully answer the requirements of Herr Diamant, the results of the essay were wonderfully favorable. The article produced was of a purity of texture and whiteness of color that left nothing to be desired; and this is all the more valuable from the difficulty usually experienced in the removal of impurities from rags. The proprietor of the invention is Count Carl Octavio Za Lippe Wessenfeld, and several experiments give the following results:

"1. It is not only possible to produce every variety of paper from the blades of Indian corn, but the product is equal and in some respects even superior to the article manufactured from rags.

"2. The paper requires but very little size to render it fit for writing purposes, as the pulp naturally contains a large propor-

tion of that necessary ingredient, which can, at the same time, be easily eliminated if desirable.

"3. The bleaching is effected by an extraordinarily rapid and facile process, and indeed for the common light-colored packing paper the process becomes entirely unnecessary.

"4. The Indian corn paper possesses greater strength and tenacity than rag paper, without the drawback of brittleness, so conspicuous in the common straw products.

"5. No machinery being required in the manufacture of this paper for the purpose of tearing up the raw material and reducing it to pulp, the expense both in point of power and time is far less than is necessary for the production of rag paper.

"Count Lippe having put himself in communication with the Austrian Government an Imperial manufactory for Indian corn paper, (*maishalm papier*, as the inventor calls it,) is now in course of construction at Pesth, the capital of the greatest Indian corn growing country in Europe. Another manufactory is already in full operation in Switzerland, and preparations are being made on the coast of the Mediterranean for the production and exportation on a large scale of the pulp of this new material."

Manufactures from Corn-shucks.—A foreigner has filed his application in Washington (with specimens) for a patent for various uses made of maize shucks. The varieties include yarn, maize cloth, paper of beautiful qualities, (white and colored,) from silk to parchment texture, maize flour, etc.

It should be known by every one, says a writer, that the dried leaf of the corn plant (corn fodder) is successfully used as a substitute for *Hops*. The infusion is prepared in the same way. Practice will soon determine the quantity necessary. In one of the government hospitals bread for four hundred men was daily prepared in this way, and it was fully equal to the best bread prepared with hops. See Life Everlasting, ("*Gnaphalium*,") in this volume.

SWEET-SCENTED GRASS, (*Anthoxanthum odoratum*, L.) Probably imported; found near Savannah River and around Charleston.

Mér. and de L. Dict. de M. Méd. i, 316 and 514. It has been used as a tonic and cordial. The fragrance, according to the analysis of Vogel, depends upon the presence of *benzoic acid*. Lind. Nat. Syst. 319.

This grass, as well as *Holcus odoratus*, contains *benzoic acid*. (Wilson.) It is thought to improve the quality of mutton, and to give fragrance to butter made of the milk of cows which feed upon it. It has been employed in making imitation Leghorn hats. "From its dwarfy growth, and the close sward it forms, it is recommended to be sown on lawns or ornamental grounds." In Patent Office Reports on Agriculture, 1854, p. 22, and in Darlington's Agric. Botany, some information is given concerning some of the best grasses for pasturage suitable to this country.

The spurry (*Spergula arvensis*) is introduced, but grows abundantly in our fields. In Germany and France it is much cultivated as a winter pasturage for cattle; mutton, as also the milk and butter of cows fed with it, are stated by Thaër to be of very superior quality. It is usually sown on stubble fields after the grain crops have been removed. "But the principal use to which this plant can be applied in this country is as a green manure on poor, dry, sandy, or worn out soils." See, also, in Patent Office Reports, Agricultûre, p. 187, an account of the Couchgrass, (*Triticum repens*,) by C. E. Potter, of New Hampshire: "It is a stocky, hardy, sweet plant, and if properly cut and cured will command a higher price in the market where it is known than the herds-grass or timothy." Besides, it is easily propagated from roots on poor lands—even on pine plains. It is very difficult, however, to eradicate. The writer states that it is heavier than any other grass when dried, and will produce more weight of fodder upon a given space.

The reader interested in the best grasses to be planted for Hay to supply the loss of Northern hay can consult article on "Textile and Forage Crops," Patent Office Reports, 1855, p. 252. See, also, Patent Office Reports, 308, 1858, on the cutting and curing of hay. The Southern planter can here obtain information which may aid him in substituting native for the imported. There are two grasses planted in Holland that I think fit to cite here, as they may be made useful where drainage is employed, or banks formed to prevent the encroachment of water, viz: the sand or sea-side Lime grass, (*Elymus arenarius*,) which Sir H. Davy found to contain one-third of its weight of sugar, hence called the "Sugar-Cane of Great Britain." It is too hard and coarse to be eaten by animals, unless cut up. "The purpose for

which this plant is generally employed, and for which its creeping, matted roots fit it in an eminent degree, is for binding loose sands when sown with the sea-reed, (*Arundo arenaria*,) to prevent the encroachment of the sea. The world renowned dikes of Holland owe much of their strength and durability to the protection afforded by these remarkable plants." See Patent Office Reports, 1854, p. 26. We have two species of *Elymus* growing within the Southern States. See article "After grass" in Wilson's Rural Cyc., for method of raising grass and hay to advantage, producing a double crop, the combination of grasses, etc. Law's Practical Agriculture, and Loudon's Encyc. of Agriculture; Wilson's articles "Agricultural seeds" and "*Grasses*," "*Agrostis*," etc.; Sinclair's *Hortus Grameneus Wobernensis*, and Richardson's Essay on *Fiorin*, (fiorin is produced from an aquatic grass, *Agrostis stolonifera longiflora*.) *Alopecurus pratensis*, meadow or tall grass, which is found in the Southern States, is much cultivated as a grass in Europe; it is much relished by horses and cattle. For wet soils *Agrostis*, and the *Poa* can be cultivated with great advantage, furnishing the greatest yield. In England they plant a mixture of the most valuable grasses upon scientific principles, upon land ill adapted for any other product, using lime, etc. See article cited, also Rural Cyc., article "Barren soils," for plants best adapted to such soils. See, also, "*Benzoin*." The *Agrostis stolonifera latifolia* (*Fiorin*) is considered by many in England as the best and most productive grass to sow on wet meadows; it is said to yield enormous crops, and it vegetates during the cold portions of the year. It has been a subject of much discordant opinion. See Richardson's Essay on Agriculture, and his Memoir on "Fiorin grass."

Wilson, in his Rural Cyc., article "Food of Animals," gives a list of the plants which are entirely avoided by all animals; also the leaves of certain trees and plants which can be used as substitutes for *hay*, when it is scarce, as follows: The leaves of elm, mulberry, ash, hornbeam; the lime trees, (*Tilia*,) the common maple and sycamore; the common acacia, (*Robinia pseudacacia*;) the willows, the poplars, the birches, beeches, plane trees, chestnuts, oaks, dogwood, (*Cornus*;) hazel, (*Corylus*;) furze, (*Ulex*,) and the vine are frequently used, he says, for this purpose on the Continent, in places where they happen to be plentiful. The green leaves of a tolerably large number of

vegetables are annually cultivated on a large scale, either as food for man or for cattle, such as the leaves of maize, beet root, cabbage, carrot, parsnip, potato and some others, all of which may be used for this purpose. *Op. cit.* So, also, the roots of a great many plants—the turnip, carrot, etc.

In times of war when there is difficulty in obtaining provisions for man and horse, many of these articles might be obtained by soldiers, detailed for the purpose from regiments in the service, particularly for the use of the cavalry horses. It is only necessary to know precisely what are the leaves or roots which are edible. See "*Zea.*" Consult Rural Cyc., articles "Grasses," "Hay," "Hay-making," for much information on forage crops and grasses, etc.

GAMA GRASS; SESAME GRASS, (*Tripsacum dactyloides*, L. *Tripsacum monostachyum*, Willd.) Fla. and northward.

This grass at one time attracted great attention as an article of fodder for stock. Darlington (Agricult. Botany, 234) thinks that its stem is too hard. "The leaves and young culms may do when better materials are scarce."

BEARDED DARNEL, (*Lolium temulentum*, L.) Ryle. Grain fields of North Carolina. Chap.

Johnston, in his "Chemistry of Common Life," vol. ii, p. 148, classes this among the intoxicating substances that are liable to get mixed up with rye or wheat, and render it poisonous. It "creeps occasionally into our fermented liquors and our bread." It grows abundantly in corn fields, and is cut with the grain. "They have been long known to possess narcotic and singularly intoxicating properties. When malted along with barley, which when the grain is ill cleaned sometimes unintentionally happens, they impart their intoxicating quality to the beer, and render it unusually and even dangerously heady. When ground up with wheat and made into bread they produce a similar effect, especially if the bread be eaten hot. Many instances are on record in which effects of this kind, sometimes amusing, and sometimes alarming, have been produced by the unintentional consumption of darnelled bread or beer. A recent case occurred, 1853, at Roscrea, in Ireland, where several families, containing not less than thirty persons, were poisoned by eating Darnel flour in their whole meal bread. They were attacked by giddiness, staggering, violent tremors, similar to those

experienced in the *delirium tremens* produced by intoxicating liquors, viz: impaired vision, coolness of the skin and extremities, partial paralysis, and in some cases vomiting. By the use of emetics and stimulants, all were recovered, though greatly prostrated in strength. The *narcotic* principle in these seeds has not yet been discovered. When distilled with water they yield a light and a heavy volatile oil; but that the narcotic virtue resides in these oils has not yet been shown. No volatile alkali like the *nicotine* of tobacco has been detected in the water and oils which distilled over."

Wilson, in his Rural Cyc., affirms the highly dangerous properties of the Darnel. Its seeds being about the same size as wheat are often exceedingly difficult to be separated, and when they "find their way with the wheat into bread flour they prove highly noxious to man, injuring his health, and sometimes producing delirium, stupefaction and other symptoms of poisoning." "It fearfully deteriorates many samples of foreign wheat." I insert this, also, because many of these symptoms, caused by eating bad flour, have been ascribed to *ergot*. The people of whole provinces in France were affected, and a commission had to be sent to inquire into the cause, which was ascribed to *ergot*. See "*Ergot*," "*Ergotetia*," in this volume.

BERMUDA GRASS, (*Panicum dactylon*, L. *Digitaria dactylon*, Ell. Sk.) Common in the low country; vicinity of Charleston. Fl. Aug.

Dém. Élém. de Bot. iii, 289. The root is used in the shape of a ptisan, as an aperient and diuretic. The extract is said to purge like manna. It is eaten by dogs to procure vomiting. The plant contains a nutritive principle.

LARGE-SPIKED PANICUM, (*Panicum Italicum*, Walt.) Grows in ponds and damp soils; vicinity of Charleston. Fl. Sept.

Dém. Élém. de Bot. iii, 286. Detersive and mucilaginous; eaten by birds, but said to be injurious to man. Mér. and de L. Dict. de M. Méd. v, 182.

BROOM GRASS; INDIAN GRASS, (*Andropogon scoparius*, Mx.) Common in fields.

I am informed by a medical friend that a poultice or a strong decoction made with this grass is applied to relieve pain, as it is thought to possess some narcotic property!

SEASIDE OATS, (*Uniola paniculata.*) Drifting sands. Coast. Dr. J. H. Mellichamp informs me that "cattle are very fond of this grass when in milk and become fat while feeding on it. The grain is large, and it is this probably which attracts the deer to the sand hills in the fall and winter." He suggests that it might be cut at the proper time and cured as fodder, and it may be worthy of cultivation.

TIMOTHY GRASS, (*Phleum pratense*, Linn.) Grows on Sullivan's Island (?) Elliott's plant is not *P. pratense*, but an imported grass. H. W. R. It is supposed to be a valuable grass.

On the subject of substitutes for Northern Hay, see "Cultivation of hay, cutting and curing," Patent Office Reports, 1858, p. 308. Grass for hay should be cut at that period when the largest amount of gluten, sugar and other matters soluble in water are contained in it. That period is not, generally speaking, when the plants have shot into seed, for the principal substance is then woody fibre, which is insoluble in water, and, therefore, unfitted for being assimilated in the stomach. It has been ascertained that when the grass first springs above the surface of the earth, the chief constituent of the blades is water, the amount of solid matter being comparatively trifling; as its growth advances, the deposition of a more indurated form of carbon gradually becomes more considerable, the sugar and soluble matter at first increasing, then gradually diminishing, to give way to the deposition of woody substance, the saccharine juices being in the greatest abundance when the grass is in full flower, but before the seed is formed. Many of the natural pasture grasses—timothy grass (*Phleum pratense*)—are exceptions to this rule. The culms of the latter "are found to contain more nutritious matter when the seed is ripe than those of any other species of grass that has been submitted to experiment; the value of the culms simply exceeds that of the grass when in flower in the proportion of fourteen to five."

GUINEA CORN; INDIAN MILLET, OR DOURA CORN, (*Holcus sorghum.*)

This plant, a native of India, has been for a long time cultivated with great success on the plantations in the Carolinas and Georgia, and it grows throughout the Southern States. The seed are produced in great abundance—they are pounded and eaten by the negroes, and are fed to poultry. The Guinea

corn makes excellent brooms, and it affords one of the best materials to supply the great demand. A brief paper on its culture can be found in the Patent Office Reports, Agricult., 1854, p. 161, by N. T. Sorsby, of Alabama. The reddish-brown variety is much more prolific than the white, as it matures early. "The plant grows well on the poorest soils, and makes a good crop on our limestone rock, where there is enough of it disintegrated to support the stalk." It needs but little culture; after it gets a start it defies weeds and grass, and will make a crop in spite of every disaster. "It is sometimes cut green for soiling cattle and mules, and if properly done, so as not to injure the buds near the ground, it may be cut several times in a season. It is also cured and made into fodder or hay. The stalks are sometimes cut before frost and put into barns, and then fed to stock. They remain green for months, and do not ferment nor spoil so soon as Indian corn or other grain." This plant will, therefore, serve as a substitute for Northern hay.

DOURA CORN, (*Sorghum vulgare*, Pers.) Cultivated.

It is said to yield a larger bulk of seed per acre than any other cereal grass whatever, not even excepting maize. It has a nutritive quality about equal to that of average samples of British wheat; it yields a beautiful white flour when crushed; and it may without any deterioration be mixed or ground up with wheaten flour, though it differs from wheat, and has some affinity to oats in containing a large quantity of *casein*. See Wilson's Rural Cyc. The broom-corn is *S. saccharatum;* the Guinea corn *S. cernuum*, Willd, according to Chapman's So. Flora.

Mr. N. P. Walker, late principal of the Institute for the Blind, at Cedar Springs, near Spartanburg, S. C., informs us that brooms are manufactured in large quantities by the blind from broom-corn grown in the vicinity.

CHINESE SUGAR-CANE, (*Sorghum saccharatum.*) (*Sorgho sucré.*)

M. De Montigny, the French Consul, introduced into Europe the Chinese sugar-cane. Its juice furnishes three important products, namely: sugar, which is identical with that of cane, alcohol and a fermented drink analagous to cider. The density varies, and the proportion of the sugar contained in it, from ten to sixteen per cent., a third part of which is sometimes

uncrystallizable. To this quantity of uncrystallizable sugar this juice owes its facility of readily fermenting, and "consequently the large amount of alcohol it produces compared with the saccharine matter, observed directly by the saccharometer." Climate makes a great difference in the amount of sugar this plant yields. "As the molasses, too, is identical with that manufactured from the cane, it may be used in the distillation of rum, alcohol and the liquor called '*tapà*,' which resembles brandy. It will be remembered, too, that in the manufacture of brandy or alcohol the uncrystallizable sugar can be turned to account, which in a measure would otherwise be lost. Another advantage consists in the pureness of the juice, which when thus converted, from the superiority of its quality can be immediately brought into consumption and use." The alcohol produced by only one distillation is nearly destitute of foreign flavor, having an agreeable taste somewhat resembling *noyau*, being much less ardent or fiery than rum. M. Vilmorin observes that the sugar is most abundant at the putting forth of the spikes, but the proportion of the sugar in the stalks continues to increase until the seeds are in a milky state. See Patent Office Reports, Agricult., 1854, p. 223. I have seen excellent *molasses* made from this plant by ordinary mills. The flavor and taste was equal to good quality of treacle, and it furnishes a most nutritious and useful food for laborers.

In Patent Office Reports, 1855, pp. 280–284, are two statements by residents of New York and Pennsylvania on the planting of the *sorghum*, also a republication of Governor J. H. Hammond's early experience with it. The plant attains from ten to fourteen feet in height. I found that in the City of Charleston, on a bit of ground which was too wet to manure any vegetable, and subject to the tides, this plant grew to a great height, even when closely sown. I am convinced that it is particularly suitable to be planted as a substitute for hay, and in lands even too wet for corn. It also grows well on high dry land. One of the writers just referred to thinks it will be of great benefit to every section of the country, "not only as a green feed during the hot months, but after being cut up and cured like the corn plant; its stalks may be steamed during the winter and given to horses, oxen or cows, which will commence eating at one end and never leave them till entirely consumed."

Gov. Hammond had a rude mill put up with two beechwood rollers. Ten canes selected, the heads of which were fully matured, yielded three quarts of syrup. The juice tested by the saccharometer showed that the youngest had rather the most and the oldest rather the least saccharine matter; he made syrup "equal to the best we could obtain from New Orleans." Lime water of the consistency of cream was put to every five gallons of the cold juice. "A good sugar mill, with three wooden rollers, may be erected for less than twenty-five dollars, and a sugar boiler that will make thirty gallons of syrup a day, may be purchased for less than sixty dollars." Since the period at which this was written, great improvements have been made in machinery, etc.

No doubt, sufficient cane for syrup, and tobacco for the use of laborers should be raised on every plantation. Patent Office Reports, 1857, contain chemical researches by Prof. C. T. Jackson (p. 185) upon the *Sorghum.* It was also determined that the "Chinese and African sugar-canes, broom-corn and doura are only varieties of a primitive species, the *Andropogon sorghum* of authors, or allowing the genus *Sorghum* to stand, *Sorghum vulgare.* These plants should not be allowed to amalgamate. The saccharine secretions of one variety will be diminished by cross fecundation with another not producing an equal amount; and the saccharine qualities peculiar to one may be lost by planting in a soil or climate differing from that which has brought them forth in unusual quality. If their cultivation as a forage crop, and a syrup and sugar-producing plant shall prove profitable, the use of the grain in the form of flour, as well as feed for stock, may considerably diminish the cost of productions. Bost. Soc. Nat. Hist. Proc. Molasses and sugar are both powerfully anti-septic, and may be used in place of salt. Wilson states "that a comparatively small quantity of sugar, without any salt, will, if applied to the muscular parts of the open fish, preserve salmon, cod and whiting for several days, and impart to them no disagreeable taste." Rural Cyc.

Prof. J. Lawrence Smith, of South Carolina, in an examination of the sugar-bearing capacity of the Chinese sugar-cane, expresses himself with great moderation. He reminds the reader that there are two well known varieties of sugar, viz: glucose, or grape sugar, (a sugar moderately sweet and difficult

of crystallization,) and cane sugar, with a very sweet taste, and easily crystallized. The first form occurs most abundantly in fruits, the latter in the sugar-cane, the beet root, the water-melon, maple, etc. Now the cane sugar is easily convertible into grape sugar, and in all processes for extracting the former, one important aim is to prevent this transformation. "For instance, were we to take the juice of the sugar-cane (containing about twenty per cent. of crystallizable sugar) and concentrate it, without subjecting it to the action of lime, or some other defecating agent, fully half of the sugar would be rendered uncrystallizable, and there would be only a small yield of sugar, but a large amount of molasses." So the impurities must be regarded which may give rise to the altercation mentioned, and the yield of sugar may depend upon the care and skill in working the juices. Dr. Smith then asserts that the juices of the cane deteriorate when kept, and advises that no time be lost after cutting in expressing the juice. By examining with polarized light, (the most accurate method,) the juice being previously clarified by acetate of lead, he says, "this result settles the question *that the great bulk of the sugar contained in the Sorgho is crystallizable or cane sugar proper*." The difference of opinion which has existed on this subject no doubt arose, it is added, from the fact that different degrees of care had been taken in the concentration of the juice, or that a more or less perfect process of defecation was resorted to. He used Soleil's polarizing saccharometer.

Dr. Smith then speaks of the processes for *separating the sugar*. Not successful with the method transmitted by Mr. Wray through the Patent Office, he prefers the following: warm the fresh juice rapidly to 120° F.; then add to each gallon of juice three ounces of lime, first slacking it with five or six times its weight of water, then bringing the temperature up to 200°. It is then filtered and carbonic acid passed through the juice, afterward filtered and evaporated to a proper subsistence for crystallization.

Each time that the juice is filtered if it be allowed to pass through well washed animal charcoal, the syrup may be made very clear and the sugar prepared from it will be perfectly white. During the evaporation the temperature should at no time exceed 215°. It often happens that we have days and even

weeks for the crystallization to take place; but it may always be hastened by adding to the thick syrup when cool a few grains of brown sugar or a little pulverized white sugar. "It must not be forgotten that sugar making is an art, and cannot be practiced by every one with a mill and a set of kettles; also, in extracting sugar from one vegetable, we are not to expect to apply successfully those methods practiced on other vegetables. It was not by applying to the beet root the method of extracting sugar from the cane that France is now able to produce 120,000,000 pounds of sugar from that root. What was necessary for the beet root is doubtless required for the *sorgho*, viz: a thorough study of its nature, with a process of extracting the sugar specially adapted to it." Another observer, from Missouri, says that a proper mill for grinding the cane would consist of three cast-iron rollers placed horizontally, so that the cane when passed through the mill would come out quite dry. Then a set of iron kettles made broad and shallow, ranged in a furnace so that evaporation might be accomplished more rapidly, would be a near approximation to the true method of grinding the cane and making molasses.

That the reader may appreciate some of the difficulties in the crystallization of sugar, and perhaps obviate them thereby, I will condense some passages from the article on "Sugar" in Wilson's Cyc. It applies as well to the problem of the sugar-producing powers of the *Sorghum:*

All acids have the effect of rendering sugar uncrystallizable. This is the case with citric, tartaric and oxalic acids, which completely and forever destroy in sugar the property of crystallization. Alkaline substances also prevent the crystallization of sugar when mixed in excess. In the manufacture of sugar, therefore, from the expressed juice of the cane, the beet, or any other sacchariferous plant, the quantity of sugar will be less, and that of molasses greater, whenever too much lime is used in the first purification of the juice. In pressing sugar-cane the juice which runs from the mill passes directly into a large boiler, in which, for purification, it is heated but not boiled with lime. The use of this alkaline earth has a twofold object to neutralize the acetic acid which exists ready formed in the woody part of the cane and is pressed out by the mill together with the saccharine juice, and to clear this juice from various foreign mat-

ters mingled with it. By the application of gradual heat these impurities form a cake with the lime at the surface of the resinous liquid, which is drawn off clear and conveyed to the first boiler. After going through several successive boilers, in each of which it is boiled to a thicker consistence, it at length becomes a thick, dark syrup, when it is put into shallow, flat coolers. The molasses separates from it. In the very damp districts the cane yields no crystallizable sugar, when the whole of the juice is used in the manufacture of spirits.

Dr. J. Brown, in 1857, reported from the U. S. Agricultural Society as follows, concerning the *sorghum* canes; the yield of juice in weight of well trimmed stalks was about fifty per cent. The number of gallons of juice required to make a gallon of syrup varied from five to ten, according to the locality, the nature of the soil on which it was produced, and the succulent condition and maturity of the canes. In the province of New Brunswick it required ten to one; in the rich bottom lands of Indiana and Illinois about seven to one; and in the light lands of Maryland and Virginia five gallons to one of syrup [observe the effects of climate and latitude.] The yield of syrup, per acre varied from one hundred and fifty to four hundred gallons. The amount of pure alcohol produced by the juice ranged from five to nine per cent. In cases where the plant was well matured and grew upon a warm, light soil, the juice yielded from thirteen to sixteen per cent. of dry, saccharine matter, from nine to eleven per cent. of which was well defined, crystallized cane sugar, and the remainder uncrystallizable matter or *glucose*, but that taken from stalks obtained on rich low lands, luxuriant in their growth, yielded considerably less.

Prof. C. T. Jackson, in his chemical researches, p. 187, (P. O. Reports, 1857,) found by experiment that "it was necessary to defecate the juice of the *sorghum* before setting it to ferment, otherwise the vinous fermentation sets in and converts all the sugar into lactic acid and *mannite*. Hence, when either vinegar, alcohol, or wine is to be made from the juice of this plant, it must be clarified or defecated by lime and heat, and then filtered. When this is done the juice is readily made to undergo the vinous fermentation by the addition of a little brewer's yeast, and afterward the returns will serve for yeast to any quantity of the juice that it may be desired to ferment. I

mention this because I know that many persons, unaware of the above named facts, have lost the sorghum juice they had endeavored to ferment* both for vinegar and wine. At the proper temperature the sorghum juice will undergo the vinous fermentation in from three to five days." Dr. Jackson, though he does not supply the great desideratum, viz: a simple and clear method of obtaining the sugar, is convinced that both the Chinese and the African variety of the sorghum "will produce sugar of the cane type, perfectly and abundantly, wherever the canes will ripen their seeds." He trusts that even the farmers of the Northern and the Northwestern States will not be discouraged. He says that if vacuum apparatus could be applied to this manufacture it would be far more sure to succeed, and "perhaps in the operation of a large farmer it may not prove an unprofitable investment to set vacuum pans on his estate, expressly for sugar-boiling. If this cannot be done, we have only to caution the experimenters against burning the syrup, and to ask them to wait at least a week before they expect to see their sugar granulate."

The following is the plan recommended by Prof. Jackson in the "*Manufacture of sugar and syrup from the juice:*"

"Omitting as of no immediate practical value to the manufacturer the more refined processes which were employed in determining the amount of saccharine matter in the juice of this plant, I now describe a cheap and economical method of syrup and sugar making, which may be used by the farmer. In the first place, it is necessary to filter the juice of the plant as it comes from the mill, in order to remove the cellulose and fibrous matters and the starch, all of which are present in it when expressed. A bag filter, or one made of a blanket, placed in a basket, will answer this purpose. Next we have to add a sufficiency of milk of lime (that is, lime slacked and mixed with water) to the juice to render it slightly alkaline, as shown by its changing turmeric paper to a brown color, or reddened litmus paper to a blue. A small excess of lime is not injurious. After this addition the juice should be boiled say for fifteen minutes. A thick, greenish scum rapidly collects on the surface, which is to be removed by a skimmer, and then the liquid should again be filtered. It will be of a *pale*, straw color, and ready for evaporation. It may be boiled down quite rapidly

to about half its original bulk, after which the fire must be kept low, the evaporation to be carried on with great caution, and the syrup constantly stirred to prevent it from burning at the bottom of the kettle or evaporating pan. Portions of the syrup are to be taken out from time to time and allowed to cool, to see if it is dense enough to crystallize. It should be about as dense as sugar-house molasses or tar. When it has reached this condition, it may be withdrawn from the evaporating vessel, and be placed in tubs or casks to granulate. Crystals of sugar will begin to form generally in three or four days; and sometimes nearly the whole mass will granulate, leaving but little molasses to be drained. After it has solidified, it may be scooped out into conical bags, made of coarse, open cloth, or of canvas, which are to be hung over the receivers of molasses, and the drainage being much aided by warmth, it will be useful to keep the temperature of the room at 80° or 90 Fahr. After some days the sugar may be removed from the bags, and will be found to be a good brown sugar. It may now be refined by dissolving it in hot water, adding to the solution some whites of eggs (say one egg for one hundred pounds of sugar) mixed with cold water; after which the temperature is to be raised to the boiling point, and the syrup should be allowed to remain at that point for half an hour; then skim and filter to remove the coagulated albumen, and the impurities it has extracted from the sugar. By means of bone-black, such as is prepared for sugar refiners, the sugar may be decolored by adding an ounce to each gallon of the saccharine solution and boiling the whole together; then filter, and you will obtain a nearly colorless syrup. Evaporate this as before directed, briskly, to half the bulk, and then slowly until dense enough to crystallize, leaving the syrup as before in tubs or pans to granulate. The sugar will be of a very light brown color, and may now be clayed or whitened by the usual method, that is by putting it into cones and pouring a saturated solution of white sugar upon it so as to displace the molasses which will drop from the apex of the inverted cone. The sugar is now refined as loaf-sugar. The methods here described are the common and cheap ones, which any farmer can employ. It may be advantageous when operations of considerable extent are contemplated to arrange a regular system of shallow evaporating pans for the concentra-

tion of the syrup, similar to those now used in Vermont for making maple sugar. It is now evident that no ordinary methods can compete with those of a regular sugar refinery, where vacuum pans are employed, and evaporation is consequently carried on at a very low temperature. If the planter should raise sufficiently large crops to warrant the expense of such an apparatus on his farm, he would not fail to manufacture larger quantities of sugar, and to operate with perfect success in sugar-making; but this can be done only in the Southern, Middle, or Western States, where extensive farming is common. Those who wish to have their brown sugar clarified can send it to some of the large refineries, where the operation can be completed and the sugar put up in the usual form of white loaves.

"A very large proportion of our agricultural people will, doubtless, be satisfied with the production of a good syrup from this plant. They may obtain it by following the methods described in the first part of this paper, or they may omit the lime and make an agreeable but slightly acidulous syrup that will be of a lighter color than that which has been limed. This syrup is not liable to crystallize, owing to the presence of acid matter. The unripe canes can be employed for making molasses and alcohol, but, as before stated, will yield true cane sugar."

The majority of cultivators in the Southern States remitted all exertions to make sugar from the African or Chinese sugar-cane. Their yield of syrup, however, proved highly acceptable and remunerative. The plants are largely grown and tended measurably to remedy the scarcity of Louisiana sugars and molasses.

Sorghum Molasses.—I copy from the Southern Cultivator the following concise and clear statement of the apparatus necessary, and of leading steps involved in the process of manufacturing the syrup, by W. Toney, of Eufaula, Ala.:

The writer recommends cypress barrels or casks for the syrup. Yellow pine, however, answers the purpose just as well as cypress.

The Manufacture of Sorgho or Southern Syrup.—My directions are for farmers and planters who have not, cannot, and would not get the elaborate apparatus of a sugar-house; but there are

essential fixtures, etc., which must be had, to wit: *A mill, boilers,* a bailing dipper of wood of five gallon capacity, with a long handle, a common dipper, and perforated ladles or skimmers.

The Mill.—Get one mill for fifty acres, and two for a hundred acres or more; the size, eighteen inches in diameter and twenty-four long, for the cylinders. They should be of cast-iron; the foundries will make them to order.

The Boilers.—They should be proportioned in size and number to the size of the crop; say *one* for twenty acres, *two* or *three* for fifty acres, and five or six for one hundred acres, more or less. As many as five or six can be put in one "battery," and be operated by one furnace, running under all. The capacity of the boilers can be greatly increased by fastening a wooden rim, eight or ten inches high around their tops. The brick work of the furnace should not reach higher on the *inside* than *midway* of the boiler, otherwise the syrup will *be burnt* by the fire.

The cane should not be cut until ripe, which may be known by the *seeds* becoming of a *purplish black,* and the stalks streaked with red on a yellowish ground. It is well to know and recollect that the *canes,* if left standing on the land where they grow, with all their leaves or fodder on them, will keep good until the crop is manufactured, if you will barely cut off all the ripe seed. If you pull the fodder the canes will dry up.

The Gathering of the Canes.—Pull the fodder as you do corn fodder each day as you grind your canes. Cut the stalks close to the ground with sharp hoes, and haul them to the mill with the seed on, with a small crop, but cut seed off in the field if a large one, dry the panicles in the sun one day, and house. The seed will equal or exceed corn on the same land; and containing, by chemical analysis, sixty-six per cent. of starch, is about two-thirds the value of corn or rye for feeding stock, or, "*horresco referens*" for making whiskey, and will command one dollar per bushel in the market.

The juice, as pressed out by the mill, should run through cloth, fastened over the receiving tubs, to clear it of all trash.

To Clarify the Juice.—Put the juice in the largest boiler, near filling it, and start a gentle fire under it, and put the juice to simmering, not boiling, and keep it so for about thirty minutes, until clarified. This is to be effected by administering some

alkali in solution. The best alkali for this purpose is the super carbonate of soda. Put one heaping teaspoonful in a pint of water, dissolve it, and pour it into the boiler of simmering juice, stir it up, and a violent effervescence takes place, rising four inches high, and finally settling in a thick, greenish scum all over the surface of the juice. Skim this off, and repeat the process every few minutes for about thirty minutes, more or less, but stop it as soon as (but not before) all effervescence ceases. This process will neutralize the sulphuric and phosphoric *acids* which abound in the Chinese Sugar Cane juice; and the Super. Carb. of Soda is the purest and best alkali for this purpose, as sodium the base of the peroxid is lighter than water. The pressure of the mill forces out with the juice a great deal of green feculant matter, which the light alkali takes hold of by the attraction of its acids, and brings to the surface a scum. These constant skimmings will soon give you a *clear juice*, capable of making a *clear*, *thick*, *acidless syrup*.

The Louisiana and West India sugar planters use *lime* to purify the juice. It will neutralize the acids, but I doubt its purifying agency. The lime will readily unite with and neutralize the phosphoric and sulphuric acids, but are not the compounds, the sulphate of lime, or "plaster of Paris," being one, too heavy to elevate the green, woody matter to the surface? I am fortified in these views against the use of lime to clarify and purify syrup by Dr. Robert Batey, one of the ablest practical agricultural chemists in Georgia. He says: "*Lime* answers no *useful purpose*, so far as syrup is concerned, save to *neutralize* the free acid which exists naturally in the cane. *Lime darkens the color*, and detracts from the grateful flavor of the syrup."

If soda cannot be had, have ready *strong lye* from green hickory ashes. This alkaline solution is the next best to that of soda, and apply it in the same way. After the juice is both neutralized of its free acids and purified of its fecula, which may be *seen and known* by the cessation of effervescence and the transparency of the juice, then boil down to the syrup point. In the absence of instruments, which cannot now be had, *be sure you boil enough.* It is safer to err by boiling too much than not enough. As a general guide, you have to go by eyesight, and as but few in the South ever paid any attention to it here-

tofore, I will give certain general rules which should be observed:

1st. Boil down until the syrup is about one-fifth of the original quantity of juice, for it is true that five gallons of juice will average one gallon of syrup. 2d. Boil down until the syrup, being reduced to about one-fifth of its original quantity, will hang in flakes on the rim of the dipper, as you pour it out and suspend it in the air. 3d. Boil down until all *water is expelled.* This may be *seen and known*, when the syrup being reduced to about one-fifth its original quantity of juice, throws up *jets* some six *inches high;* this latter is the *water escaping* as steam; *continue to boil* until these *jets cease;* then strike off your syrup into tubs, and when cold, barrel it.

The Barrels.—Put up your syrup in *cypress barrels;* white oak barrels will not hold syrup. Several large planters put up their syrup in poplar troughs. These will hold the syrup, but the oxygen of the atmosphere will certainly, as it has done, *acidify* it, as it thus has so much surface to act on.

In conclusion, the Chinese Sugar millet is an industrial plant of great utility to the South, in these our times of trial, blockade and war. Its *fodder* is equal to that of corn, its *seed* is equal to two-thirds of corn, and its syrup nearly equal to that of sugar-house molasses, yielding as many gallons of syrup per acre as the land can pecks of corn.

A cheap and good *vinegar* can be made from molasses or syrup: "To eight gallons of clear rain-water add three quarts of molasses; turn the mixture into a clean, tight cask, shake it well two or three times, and add three spoonsful of good yeast or the yeast cakes. Place the cask in a warm place, and in ten or fifteen days add a sheet of common wrapping paper, smeared with molasses, and torn into narrow strips, and you will have a good vinegar. The paper is necessary to form the 'mother' or life of the liquor." The scientific mode of making vinegar rapidly is to pass the liquor repeatedly through barrels filled with wood shavings; any sweet fruits, or roots, such as figs, beets, watermelon juice, etc., add to the bulk and quality; see "*Beta*" and "*Ficus.*" Sweet substances added to vinegar will increase the quantity when exposed to the oxygen of the air for the acetous fermentation to be effected. This is promoted by heat.

In a communication from Mr. W. G. Simms (1863) he informs me that he made excellent *Vinegar* from both the May-apple and persimmon, thus: three bushels May-apple pulp, carefully crushed out of the sack, five gallons of molasses, three gallons of whiskey; this with thirty-five gallons of water made forty gallons of fine red vinegar. The persimmon makes a "beautiful white wine vinegar," thus: three bushels ripe persimmons, three gallons of whiskey, twenty-seven gallons of water.

The following was communicated by Mr. C. Orr, of Mississippi:

"I find from experiments I have made that the seed of the sugar-cane (*Sorgho sucré*) parched and ground as coffee, prepared in the usual way, but by being boiled a little longer, make an excellent *substitute for coffee*, and my own impression is that if it was brought into general use thousands would adopt its use instead of coffee, even if coffee should again be offered at its former low prices, from the fact that all could grow and cultivate it with so little labor, and from its approaching so near to *the best Java*."

A palatable bread was made from the flour ground from the seeds of this plant, of a pinkish color, caused by the remnants of the pellicles or hulls of the seeds. By accounts from all parts of the country, this plant is universally admitted to be a wholesome, nutritious and economical food for animals, all parts of it being greedily devoured in a green or dried state by horses, cattle, sheep, poultry and swine, without injurious effects, the two latter fattening upon it equally well as upon corn.

A New Value of Sorghum.—The inestimable value of this production, says the Lynchburg Virginian, is only beginning to be appreciated by our people. It may not be generally known that the grain or seed constitute an excellent and prolific breadstuff. A correspondent writing to us on the subject, from Pattonsburg, says: "I had fifty bushels of the seed which I raised last year, and a short time ago I took six bushels to the mill and got it ground into flour, and have been using it in my family for bread for several days. It makes really good loaf bread and light rolls. It is the red seed."

Paper of various qualities has been manufactured from the fibrous parts of the stalk, some of which appears to be particularly fitted for special use, such as bank notes, wrapping paper, etc.

To show the progress that has been made since the first Edition of this volume was issued, I am enabled now to add what follows with reference to what may prove to be a great source of profit to our country:

Prof. Wood, U. S. Disp., 12th Ed., 1866, states that "credit is due to Mr. J. S. Lovering, of Philadelphia, for first demonstrating in this country, that *Sugar* might be advantageously made from the Chinese Sugar-Cane; and his pamphlet on the subject may be found useful by those who purpose to engage practically in its manufacture.". The credit for the practical application of this discovery has been claimed for Messrs. Waller & Hatcher, parties in Kentucky.

The following has been published in 1866:

Sorghum Sugar.—Much importance is attributed by some of the Western papers to a new invention by which sorghum molasses is almost instantly converted into sugar. The syrup is driven off by centrifugal power and granulation effected. The St. Louis Democrat speculates upon the results as follows: "This discovery must of course work a considerable change in the saccharine trade of the country. Wherever corn grows it may be made to grow, and farmers, through this simple process, will now be enabled to supply themselves with all they need in the way of sweets. As the machinery is by no means costly, we presume the improvement will generally be made available. Sugar must become cheaper, and its consumption greatly increased.

"Fruits, large and small, which now, on account of the cost of the saccharine matter, are greatly wasted, will be preserved to a much greater extent, and healthy and invigorating food thereby secured. This invention may be considered as one of the greatest of the age. The forces employed are without cost, and require no education to govern and direct them. After the molasses is prepared in the usual way, which every one comprehends, the turning of a crank completes the process, and consummates the entire work most perfectly. No heating is necessary, no evaporation or delicate manipulation, or chemical mixtures. The cold sorghum is converted in two or three minutes into refined sugar and molasses."

I have seen very excellent brown sugar manufactured from this plant and presented to the Agricultural Convention of South Carolina, 1869, by Dr. Passmore, of Greenville, where works are

constructed for the purpose. A large establishment exists in Louisville, Ky., so that the difficulties which beset the enterprise when the first Edition of this volume was printed are already being fast overcome.

I have received (May, 1869) a letter in reply to one asking for information, from Dr. W. P. Passmore, the Agent at Greenville. S. C., of the So. Sorgho Company of Louisville, Ky., accompanied by circulars. He writes, "ours is a double process both of defecation and evaporation, so as to extract all the feculent vegetable matter which heretofore gave syrup such a nauseous taste and prevented granulation. We use no chemicals or nostrums, and the whole process is natural and mechanical so as to be worked by any one." He is willing to give information; and citizens of Greenville attest the excellence of the results both with respect to the syrup and sugar madé at the works.

The pamplets are from Lewis, Wilhelm & Johnson, proprietors, Louisville, Ky., to whom applications may be made, or to the agents in the several States, and contain the certificates of a large number of persons, members of Agricultural Societies and others who have personally inspected the works, and who testify to the success with which both syrup and sugar are made of excellent quality. The yield is often seven pounds of sugar to one gallon of syrup, or five pounds of dry sugar and about five pounds of molasses.

The committee of the Lexington Farmer's Club report: "The process of manufacture is exceedingly simple, so much so that any family obtaining the right to do so may manufacture their own sugar at comparatively small cost." "An acre of cane upon an average it is computed will yield one hundred and fifty gallons of syrup; so far as tested this will yield from five to seven pounds of sugar to the gallon, or from seven hundred and fifty to one thousand pounds of sugar to the acre, and a remainder of from one to two barrels of syrup. All the syrups made by this process will granulate more or less, the black Imphee, however, more than the white; therefore, where sugar is the object, the black should be raised; and if syrup, then the white." Barbaroux & Co., of Louisville, Ky., and Jno. Alexander, Congaree Iron Works, Columbia, S. C., manufacture "self skimming" Evaporators, Mills, etc., at a cost from one

hundred and fifty-five to one hundred and seventy-five dollars. Dr. Passmore makes the following statements in his pamphlet:

The large quantities of *Sugars and Syrups* consumed yearly by South Carolina, together with the exorbitant prices these necessary articles now command, render their production and manufacture vitally important to all, but more especially to the farmers and laborers. I, therefore, beg leave to call your attention to the "Great Southern Process," which places within the reach of the humblest, for a small sum, the privilege of making his Sugar and Syrup. Heretofore South Carolina was unable to produce her own Sugar, because her land neither yielded the maple or tropical cane in sufficient abundance to justify the erection of suitable machinery to convert into Sugar the juices of either, but by this late discovery she can make Sugar in any quantity. Of the certainty of this process none need have any doubts, for it has undergone the most thorough investigation and surmounted the most sceptical doubts. Its simplicity, too, is perfectly wonderful, for with ordinary hands a fifteen year old boy can operate it successfully. *South Carolina pays annually over $4,000,000 to foreign lands for her Sugars.*

The "Great Southern Process" is in very general use in the States of Indiana, Ohio, Illinois and Kentucky, and the Sugars and Syrups made by it compete successfully with other Sugars and Syrups. In consideration of the difficulties in Cuba, and the inevitable abolition of slavery throughout the world, Sugar production offers to all a fine opportunity for making money.

Sugar.—The Sugar made by the process "is equal in color, brightness and sweetness to the best refined 'A' Sugar ever made." An acre of land yields from five hundred to one thousand pounds, besides leaving a residuum of fifty and one hundred and fifty gallons of golden Syrup respectively. Our Sugar will command in this market to-day from twenty-two to twenty-five cents. Our best article is obtained by using a centrifugal mill, and as they cost very little, I advise all to use them in preference to "press force," which requires bags made of the cloth used by cotton seed oil manufactories, and is much more tedious and troublesome, in my opinion. An acre of land which yields five hundred pounds of Sugar, will pay the owner as follows:

500 lbs. Sugar, 20c	$100 00
50 gals. Syrup, 80c	40 00
25 bushels Seed, 35c	8 75
	$148 75

Of this amount it will not take more than thirty dollars to pay *all expenses*, and, therefore, the acre would net one hundred and eighteen dollars and seventy-five cents. These figures may not hold good with all, but suppose you divide them by two and claim fifty-nine dollars and thirty-seven and a half cents as the net yield of an acre; would not that satisfy you?

Syrup.—Our Syrups have been pronounced excellent, but as all know the Sorghum canes will make a good and merchantable article of Syrup, I will only remark that by our process the "old Chinese cane" makes a bright, beautiful and delicious Syrup, which rivals even honey. It commands readily from eighty cents to one dollar at our manufactory.

Complete Machinery.—The Great Southern Cast-Iron, Self-Skimming Coagulator is the great invention of the age in evaporating cane juice. The set is composed of three separate pans, arranged on two furnaces, at a less cost than any evaporator in use. They are flowing pans, without ledges, and will evaporate from one hundred and twenty-five to one hundred and fifty gallons of Syrup per day.

Complete Set of Evaporators	$80 00
Heavy Two-Horse Mill	80 00
Two Iron Furnaces, complete	80 00
Swing Pipes, Skimmers, complete	15 00
Total Machinery	$255 00

On these evaporators the heat is more regular; you get a uniformity of Syrups. You get all the green scum on the first pan. The capacity of this set of pans is greater than any two evaporators in use. They are quite simple and easily worked by any one.

The following instructions for the cultivation of Sorghum have been furnished by Messrs. Lewis, Wilhelm & Johnson, of Louisville, Ky.:

We can only meet these objections and overcome these prejudices by the assistance of farmers who are willing to give

Sorghum a fair trial. To do this they must begin by procuring and planting pure seed. This fact need not be urged upon those who have planted pure seed and made a gallon of fine Syrup to four or five gallons of green juice, while it takes from seven to ten gallons of juice of hybridized canes to make one gallon of very ordinary Syrup. There is no other remedy for this falling off than the planting of pure, well-matured seed. In order to procure good seed, the cane must be carefully cultivated for the seed alone and not for the Syrup, by allowing the seed to mature and dry on the stalk in the field. Last summer we had the seed cultivated by careful farmers. We are prepared to fill orders for pure seed at cost price. We do this, hoping to remove the prejudices, and make the cultivation of Sorghum a success. We advise farmers to avoid, as much as possible, black, mucky soils; if planted upon bottom lands at all, it should be dry, sandy soil. Very rich soil of any kind is not favorable to the production of light Syrups. Good land, not foul with weeds, should be planted in drills. As much of the cane should be allowed to stand as the ground will bear. Of this farmers must judge for themselves. A large overgrown stalk is not the best for Syrup or Sugar, but the medium, or even small stalks, are better than the large, rank cane often seen on rich soil. If the soil is not good, or is foul, the seed should be planted in hills. Sorghum while growing requires very close attention until it is well started, and then it will leave weeds and everythig else in the back-ground. The seed should be prepared first by cleaning and then by pouring warm water over it until covered two or three inches in the vessel. If well stirred the light chaffy seeds will rise to the surface, which should be removed. The vessel should then be set in a warm place until the hull of the seed shows a disposition to burst, then the seed should be spread out until nearly dry, and in this condition should be placed in the ground. If this plan is strictly observed every seed will grow. If planted in drills one seed in a hill is sufficient. If planted in hills two to five seed are all that is needed.

The ground should be well pulverized. The best way is to throw two furrows together and plant the seed on the ridge. It should be covered as lightly as possible, and the cane will appear in a few days. It will require careful nursing for a short time, but it will soon become strong and will overcome all ob-

stacles. It should not be "thinned" too much. Let as much grow as the ground will support. The best varieties of cane for Syrup are the old-fashioned Chinese, or Black Top, and the Red Top, or Liberian cane. The most successful for producing Sugar, so far as yet demonstrated, is the Oomceanna, or Black Imphee, or African variety.

LOUISIANA SUGAR-CANE, (*Saccharum officinarum*,) cultivated in South Carolina, Georgia, Florida and Louisiana; Its value is well known. The juice is said to be an antidote for poisoning by arsenic, and it might be temporarily substituted for the hydrated sesquioxide of iron.

In Agricultural Reports of the Patent Office, 1855, p. 268, there is a paper on the "Failure of the Sugar-Cane in Louisiana—proposed plan for restoration," etc. A brief history of the origin of the cane is given, and the varietes usually planted. The introduction of new plants by cuttings from British Guiana, or Venezuela, is advised, and the practice of rotation with certain specified plants, viz: wheat, the Chinese yam, the bitter and sweet cassada, (*Jatropha*,) and other fusiform roots, as well as the peanut, Palma Christi, Bené, etc.

For sugar from canes, whether Chinese or African, consult DeBow's Review, and the Patent Office Reports, 1848, pp. 281 and 512, for long articles with plans, drawings, and a full description; also Olcott's work on the Imphee and Sorgho, with methods of grinding, crystallizing, etc., and translations from the French. In these all the processes are described for preparation of syrup, molasses, best varieties of cane, mode of culture, etc., etc. See, also, Gov. Hammond's contributions and experiments in "South Carolina Agriculturist," published by Mr. A. G. Summer, Columbia, S. C., 1856. These papers are too long to admit of their introduction here, and I content myself with directing the inquirer to the best sources of information. I have seen very fair specimens of sugar made by Mr. Jno. Townsend, from canes growing on Edisto Island, S. C. They are sold in the Southern cities as an article of food. The juice is nutritious and is thought to be beneficial to children in preventing worms. Wax is obtained from the surface of the cane by scraping. See Olcott's work for account of its collection in Algeria.

CAROLINA RICE, (*Oryza sativa.*) Cultivated extensively

in the lower portion of South Carolina and Georgia, on the Cooper, Pee Dee, Savannah, Santee and other rivers. A variety called "high land Rice" is also planted. See paper on the mode of culture in South Carolina, by Gov. R. F. W. Allston, in P. O. Rep., 1854; also article "Rice" Rural Cyc.

U. S. Disp. 1268. The "seeds, being wholly free from laxative power, are adapted to cases of weak bowels, in which there is a strong tendency to diarrhœa." The decoction of rice water is very applicable, as a nutritive drink, to fevers, and inflammatory affections of the stomach, lungs and kidneys. This plant is well known and largely used as an article of food, and for exportation. See authors for references. Carolina Rice was found by Bracconnot to contain 85.07 per cent. of starch, 3.60 gluten, 0.71 gum, 0.29 uncrystallizable sugar, 0.13 of fixed oil, 4.80, veg. fibre, 5.00 of water, and 0.40 of saline substances.

Dr. Wood (U. S. Disp.) discredits the opinion, expressed by some, that a rice diet produces injurious effects on the eyes—the condition of myopia, for instance. During a residence of some years in both sections of South Carolina, my observations have been directed toward this point with special attention. I can safely assert that in the lower country of this State, where rice has long been a favorite article of food—the whites partaking of it every day, and in some form at almost every meal—the number of near-sighted individuals bears a proportion of at least ten to one over those residing in the upper districts, where it is well known that its use has only lately been generally introduced. So far as my experience goes, as well as that of many others, of whom inquiries have been made, scarcely an example can be found of it in the latter portion of the State, which is distinguished from the other by pretty accurately defined limits. If such a relation does exist between the quality of the ingesta and the greater convexity of the cornea, which further investigation and comparison must confirm or reject, it is exceedingly curious, there being as yet not even a hypothesis accounting for the *modus operandi*. It has also been indistinctly assumed to depend upon a long course of luxurious living in the ancestors. Any objections to the first ground, founded on the assertion that the negroes in the lower country are not affected in this way, may be anticipated by the reply that we seldom or never *know* when there is among them

such defect in the power of vision ; and besides, they are in fact not generally furnished with rice as an article of food. The condition of things in Hindostan and China might throw some light on this question. I am informed by a gentleman in whose statements I put implicit confidence that rats infesting a granary where rice was stored were always found to be blind!

An excellent bread is made of rice flour. "A quart of rice flour is made into a stiff pap by wetting it with warm water, not so hot as to make it lump; when well wet add boiling water, as much as two or three quarts; stir it continually until it boils, then add one pint of milk; when cool enough to avoid scalding the yeast, add half a pint of good yeast and as much wheat flour as will make it of a proper consistency for bread; put it to raise; when sufficiently risen it will be necessary to add a little more wheat flour. If baked too soft the loaves will be hollow. The bread must stand half an hour or more in a warm place after it is put in the baking pans, and it will rise again almost as much as it did at first. The same mixture, rather thinner, baked in muffin rings makes an excellent bread." (Southern Agriculturist.) On the plantations at the South much use is made of rice in this and other ways, and I inserted the recipe among our other "resources" in times of war and blockade.

Parched rice has been used as one of the substitutes for *coffee*, (see potato, *Convolvulus*.) A correspondent says that corn and rice mixed in equal parts, ground and boiled, make an excellent substitute for coffee. As the grain of corn is harder than that of rice it needs more browning, and should be exposed to the heat a few moments before the rice is put in. The writer claims that "the beverage is equal to the best coffee!" Rice starch prepared in the same way as that from corn and the potato is said to give "lawns and colored articles a look of newness unsurpassed."

A good deal of Rice is cultivated throughout the South in the inland swamps which are cleared and drained for the purpose. The rice is planted in drills or in rows from two to three feet apart and kept free of grass. The variety called Highland Rice will flourish on high lands removed from swamps, even those which are sandy and containing little moisture. An account of Rice Culture and preparation, written by Mr. A. L. Taveau, of S. C., is published in the P. O. Rep. for 1867.

The late Gov. R. F. W. Allston, himself a successful cultivator of rice on the Waccamaw River, in his "Essay on the seacoast crops, read before the Agricult. Assoc. of the Planting States," which was also in part reprinted in the P. O. Rep. for 1854 and in DeBow's Review, says of Rice Culture:

Cultivation of Rice.—The numerous islands of which this region is composed, are all enclosed (leaving an outside margin twenty to thirty feet wide) by dams high enough and strong to resist the highest spring-tides. The entire area is divided into "squares" or fields, containing twelve to twenty acres each, by a series of check-banks, made up by excavating all around the field, at a distance of eighteen feet from the centre of the line on which the bank is to be located, a ditch some six to eight feet wide by five feet deep.

The fields are further prepared for cultivation by excavating from ditch to ditch, in one direction, a number of smaller ditches called "quarter drains," fifteen to eighteen inches wide and three feet deep, located parallel to each other, at the distance of seventy-five, or fifty, or thirty-seven and a half feet apart, as may be required by the nature of the land and the pitch of tide in which it is found. Across the frontier bank, and in a line with one of the main ditches, a deep cut is made, in which is placed and covered up, a (wooden culvert twenty feet long and open four feet by two) "trunk," furnished at both ends with a sluice-gate, for either admitting the tide over the field, or withdrawing it as may be desired.

Thus has the tide-swamp been subdued and converted into flourishing fields, inviting diligent husbandry.

Sailing up one of those fruitful rivers, the traveller may now behold many miles of serpentine embankment, (continuous save where a water thoroughfare occurs,) enclosing thousands of acres, checked into fields, which bear in waving luxuriance crops of this translucent grain. Rough Rice as it comes from the field is translucent in a degree sufficient for an experienced eye, when holding a head or sheaf of Rice up toward the sun, to detect the red-rice, which is opaque.

Rice, for which we are indebted to the Island of Madagascar, was introduced into Carolina and America at once, toward the close of the seventeeth century. A few grains were sown in the garden of Landgrave Smith, the site of which is now entirely

covered by houses and modern improvements, in the City of Charleston. Those few grains produced many ears, which being disseminated for seed, succeeded in adaptation to the climate; and the low country of South Carolina since, has become the centre of the rice-growing region. The first seed was white, such as is grown in China and Guiana to this day, and such as may still be seen produced on the uplands and inlands of America.

Some time before the Revolutionary war, the "gold seed" Rice was introduced, which, owing to its superiority, soon entirely superseded the white. It is now the rice of commerce, and the only grain referred to herein, when rice is mentioned, without being distinguished by some peculiar name, or characteristic.

This "gold seed" has undergone improvement in latter years. Hence has resulted the production of a variety longer in the grain, but not perceptibly larger otherwise, which is highly esteemed by foreign consumers, when it is produced in perfection, commanding the highest prices in market. It is called "long grain" Rice, and was obtained from the sowing of part of a single head on the plantation of the late Hon. Joshua Jno. Ward, of Waccamaw.

The white Rice of the present day measures three-eighths of an inch in length, the same in circumferance around its shorter axis, the grain being in shape an irregular elipsoid, and in weight numbers nine hundred and sixty grains to the ounce, (Troy.) The gold seed, the Rice of commerce, measures three-eighths of an inch in length, the same in circumference, and in weight numbers eight hundred and ninety-six grains to the ounce. The long grain Rice measures five-twelfths of an inch in length, three-eighths of an inch in circumference, and in weight numbers eight hundred and forty grains to the ounce.

The system of culture for one is suitable for any of these varieties. The first, it is said, will bear upland culture better. The last (long grain) it is supposed, will bear water better. It does not tiller as much, shoots up a taller stock and longer head, but does not bear as many grains to the head as the other, and more commonly approved kind of gold seed.

We begin the preparation for a new crop by (cleaning out the ditches every third year; the drains are cleaned out every

year after plowing) plowing the land as soon after the harvest as the fields can be gleaned, and the scattered rice left on the surface be sprouted. The stubble is turned under by running a deep furrow, say eight inches. This may be continued until the end of January. The sods should have the benefit of the entire winter frosts, if possible, the influence of which disintegrates and prepares them duly for the levelling. Both plowing and harrowing are performed, ordinarily, by oxen—two yoke being required if we go deeper than six to eight inches; and two yoke get on badly in the swamp. The Tuscany breed furnishes the best oxen for our climate.

In March, or when about preparing to plant, the harrows will be made to pass over the plowed ground. After deep plowing the "plow turns" should be broken up with the spade, sinking the spade as deep as the plow has gone, say eight inches; an able-bodied man will break up in this way, and thoroughly, a surface of fifteen hundred square feet in a day. The field should be well drained however. The hoe follows to cut up and break the remaining clods and level the surface. The more the soil is comminuted, and the surface brought to a common level, the better. The trenchers then come in with hoes made for the purpose, and trace out with great accuracy the drills in which to sow the seed fourteen, thirteen or twelve inches apart from centre to centre. They will average (some drawing stake-rows and others filling up the panels) three-quarters of an acre to the hand in a day's work. When the land is new the trench should be broad, say five inches, and the rice may be scattered in the trench; but for old land, and most of rice land is now old, narrow trenching hoes are preferred, opening a drill three inches wide. Infected with grass-seed and volunteer rice, old land requires close hoeing, and every seed that vegetates outside the drill is cut up and destroyed.

The field now in high tilth, and resembling somewhat a garden spot, is ready for the seed. The sowers with great care, yet with wonderful facility and precision, string the seed in the drills, putting two and a half or two and a quarter bushels to the acre. The labor of sowing depends so much upon the state of the weather, whether windy, or moist, or otherwise, it is better not to require any given task. Generally, each woman will accomplish two or three tasks and do it well—it should

never be done otherwise, for the seed cannot be recovered if too thick, nor if too thin, can the sowing be repeated without needless waste and increased irregularity.

The best hands are chosen to sow Rice. When Rice is to be covered with water, without a previous covering of earth, the seed must first be prepared by rolling it in clayed water. There are many planters who still prefer the old system, covering the seed with earth. In this case, after the seed is covered, the water is taken on the field for five or six days to sprout the grain, when it is drawn off, and is returned only when the sprout, "in the needle state," is seen fairly above ground. This, "the point flow," is held about four days and then drawn off; after which the culture is the same as above described throughout. The sowing done, water is forthwith admitted, (two tides are better than one,) and the field remains covered until the sprout becomes green and begins to fork. The water must then be withdrawn, else the plants will be forced to the surface by any slight agitation and float away from their position. The reasoning for the successful substitution of a covering of water for a covering of earth in planting Rice, and also for the requisition of sound and perfectly full seed, will be found in the law of germination and growth.

Prof. Johnston thus expresses it: "When a seed is committed to the earth, if the warmth and moisture are favorable it begins to sprout. It pushes a shoot upwards, it thrusts a root downwards; but until the leaf expands and the root has fairly entered the soil, the young plant derives no nourishment other than water, either from the earth or from the air. It lives on the starch and gluten contained in the seed."

In the case of Rice covered with water, the first shoot is radical and tends downwards, but it does not take root until the air is admitted to the leaf, the lungs of the plant, then it becomes rooted instantly. If the water be not reduced when the sprout becomes green, (until the sprout is green it cannot bear the rays of the sun,) the expanding of the leaf in the water will draw up the unfixed root and the whole will rise and float upon the surface.

The water, after floating the trash to the banks, should at no time be over deep, lest the process of germination be delayed,

and with any imperfect or defective grains be prevented altogether.

In Georgia, on one of Dr. Daniels' plantations near Savannah, the Italian method has been pursued with a good degree of success, namely: The seed is first sprouted, then sown broadcast over the field and covered up by the harrow, which, being reversed, is drawn over the surface. The culture there is with water chiefly.

In twenty days after, or thereabouts, the Rice is hoed and flowed deep, the water over-topping the plant for two or three days, in order to destroy the young grass just springing up among the plants, and also the insects that may have lodged upon the blades, or which may have been generated among the stumps or roots, or stubble. At the end of two or three days the water is slacked down to about half the height of the plant, now somewhat stretched. At this depth it is held until the plants grow strong enough to stand erect, and will admit the laborers to walk between the trenches and pull out the long grass which shows itself, and which will now yield to very slight effort. If any rushes appear they will now be plucked up by the root and borne out to the banks.

Two days after this weeding, the long water will gradually be drawn off. In Georgia, and elsewhere perhaps, this is called the "stretch flow." In that State, as well as in some parts of Carolina, the practice is common to continue the point flow into the "stretch" or long flow, without drawing the water until the latter be over. This free use of water, as it may be made to substitute one hoeing, may enable the planter to cultivate seven or eight acres to the hand, instead of five and six as of old. But, the proprietor who suffers this method to be practiced in his culture, year by year, if his young crop be not often troubled by the maggot or root-worm, will probably find his land so polluted with water grasses after several years, and so packed as to require rest and change of system to ameliorate it. A succeeding tide will be taken in and let off immediately, in order to wash out the ditches. Two men, furnished, each with a long handled rake of curved iron teeth, are put to rake from the ditches all the water-growth which impedes the draining, placing it on the side of the bank. In eight days (the

land by that time should be dry) the smaller hoes are used, and the soil is stirred as deep as it can be with them. The hoe now used has been reduced, latterly, to four inches in breadth. The plant just recovering from the effects of long water, and taking a dry growth, is putting forth new green blades and fresh roots, which, not long enough yet to be interfered with by the deep hoeing, very soon yield to the grateful influence of the air admitted, shoot vigorously into the loosened earth, and nourish a "good stalk."

In the course of fifteen or eighteen days, the field is hoed again and weeded. This last hoeing is also done with the small hoes, but very lightly, to avoid disturbing the roots which are now extended nearly midway between the trenches. As the plant is now beginning to joint, the laborers will step about with care, for if one be broken at the joint it cannot be restored. A day or two after this third hoeing, the water is put on again, as deep as the last long flow, and is gradually increased in depth after the rice-heads have fairly shot out.

This is called the "lay-by" flow. Some planters have this flow very shallow, insisting that a deep flow breeds worms to the injury of the plant before it has shot out, in which case the only remedy is to dry. Up to the time of this flow, is about ninety days for Rice sown the first week in April. After this, to the period of maturity is from sixty to seventy days, during which the water is often changed, and kept fresh, but is never entirely withdrawn, until the grain be ripe for the harvest. The improved and best means of keeping the water fresh is to furnish the field with two trunks—one to admit fresh water at every flood-tide, and the other to void it with the ebb, so that twice in twenty-four hours there is obtained a slight current through the field. This, besides lessening the infection of the atmosphere (miasmata) by stagnant water, keeps the roots of the plant cool and healthy, though it postpones the ripening of the Rice some five or eight days. Meantime, should any grass have escaped the previous hoeings and weedings, it will show its crest before the Rice matures and be plucked up by the roots. All white Rice will be stripped off by hand.

Harvest.—And now the grain is ripe for the sickle. The Rice is cut a day before you will say it is fully ripe. For Rice sown April first, the harvest begins usually from the first to the tenth

of September. The water is drawn off over night. Soon after the rising of a bright autumn sun, the reapers are seen amid the thick hanging grain, shoulder-high, mowing it down with the old fashioned sickle. Before the dew is all gone, the Rice is laid prostrate, even and orderly, across the porous stubble. The next day, when quite dry of dew, it is tied up in sheaves, and borne away to the threshing yard, where it is well stacked before the night dew falls heavy. This last heavy but gleeful labor completes the field culture of the Rice plant. When the stack has undergone its curing heat, and become cool again, the Rice is threshed out by one of Emmons' Patent Machines and sent to the pounding mill to be cleaned. The mill performs ingeniously enough the finishing process, thus: By steam power, the rough rice is taken out of the vessel which freights it, up to the attic of the building—thence through the sand-screen to a pair of (five feet wide) heavy stones, which grind off the husk—thence into large wooden mortars, in which it is pounded by large iron-shod pestles, (weighing two hundred and fifty to three hundred and fifty pounds,) for the space of some two hours, more or less.

The Rice, now pounded, is once more elevated into the attic, where it descends through a rolling-screen, to separate whole grains from the broken, and flour from both; and also through wind-fans, to a vertical brushing screen, revolving rapidly, which polishes the flinty grain, and delivers it fully prepared, into the barrel or tierce, which is to convey it to market. The barrel is made by coopers attached to the mill, each one dresses his stuff and makes three barrels a day. He is paid twenty-five cents for each barrel made over his number. When the stuff is dressed previously, five barrels, and even more may be made. The staves are of yellow pine, forty inches in length; the heading of inch plank is made twenty-four inches in diameter. The barrel should contain at least six hundred pounds net.

There were several Machines for dressing staves, exhibited at the World's Fair in New York. Hawkins' I saw in operation, and admired.

In Rice-planting the practice of manuring is of recent origin, excepting of course that best of all dressings, to which we are indebted for increment of the soil itself, the natural deposit,

namely, of sediment when the rivers overflow their banks, or silt from seaward, when the turbid waters, admitted into the fields, are held there. undisturbed for days. A good time to apply rice-flour to Rice, is to scatter it between the trenches immediately after the long flow. If the dressing be too heavy, the Rice, made too luxuriant, will lodge, and waste in the harvest. In applying lime, (one hundred bushels is safe, if there be plenty of stubble, or peaty fibre, or a thick native growth,) time should be given for it to act chemically and to become incorporated with the soil, before water is put on the land. Rice-straw if listed into the fallow ground, and well covered up with a bed of earth, will be decomposed by planting time, and make a fine manure, improving the crop in both quantity and quality.

Rice-chaff, spread three or four inches thick over the fallow ground, and plowed in, will produce a like effect in course of time. It is not as readily decomposed as the straw, and may disappoint early expectation. Rice-flour is a still better, more stimulating dressing, but not so lasting in its effects. It may be applied (thirty bushels to the acre) broadcast, and plowed in before planting, or it may be scattered between the trenches after the long water, as above described.

CANADA RICE; MINNESOTA RICE; WILD RICE; WATER OATS, (*Zizania aquatica.*) Deep marshes and ponds; Florida and northward. Chap.

This plant was experimented with by Sir Joseph Banks, by removing it from Canada to England in 1791. At first it could scarcely endure the climate, but gradually improved and became thoroughly acclimated. It became "in fourteen generations as strong and as vigorous as our indigenous plant." "It abounds in all the shallow streams of North America, feeds immense flocks of wild swans and other water-fowl, contributes largely to the support of the wandering tribes of Indians, and seems destined, in the opinion of Pinkerton, to become the bread-corn of the North. This grain has become acclimated in Middlesex, producing bland, farinaceous seeds, which afford a very good meal." Wilson's Rural Cyc. p. 30, art. "Acclimation." It would perhaps reward the trouble to experiment with this plant at the South, in order by cultivation to procure a new cereal. Consult, also, Dr. Macculloch on the Naturalization of Plants, Quarterly Journal of Science, vols. xxi and xxvi. Mills states in his Statistics of S. C. that it is cut for fodder.

Extravagant accounts were given of this plant some years since. Dr. J. Bachman considered it about as good as oats, although somewhat more saccharine. He says the grains may be ground up together as a substitute for Graham flour.

Leersia oryzoides, Swartz. Florida; Columbia; St. John's.

This grass has been cultivated several years by Dr. S. Stuart at his summer residence near Pendleton. He expresses himself much pleased with it. It affords several cuttings through the season, and seeds late. Gibbes' Catalogue of Plants, Columbia, S. C.

WIRE GRASS, (*Aristida*, or *Sporobolus*.) Mr. Simms writes me that bonnets are made of this grass, 1863; matting and curtains may also be wrought with it and dyed.

WALTER'S GRASS, (*Trichodium perennans*, Ell. *Agrostis perennans*, Gray.) Swamps and river banks; Florida; St. John's Parish, S. C.

This was the grass which was cultivated by Mr. Walter and Mr. Fraser, who published a plate and description of it for the purpose of procuring subscribers in England and this country—the seeds to be furnished at two guineas a quart when five hundred subscribers should have been obtained. Mr. Thos. Walter, the author of the Flora Caroliniana, who resided on the Santee, thus speaks of it under his *Cornucopia perennans:* "*Gramen undique læve, saccharinum, æstatem sustinens, in hyeme vigens, radicibus geniculisque se cito propagans. Donum inæstimable, conditore ad hanc diem reservatum, hoc ævum, me instrumente, locupletarum!*" Mr. Elliott says of it that "it is a fine, delicate winter grass, but never appears to grow vigorously enough for the scythe, nor will it bear, except in shaded or damp soils, the heat of summer." See notes to L. R. Gibbes' "Catalogue."

WHITE RUSH; RUSH-LIKE SPARTINA, (*Spartina juncea*, Schreber, Ell. Sk. *Limnetis* of some Bot.) Grows in the salt water marshes; vicinity of Charleston; often immersed. Fl. August.

Dém. Élém. de Bot. vi, 655. The flowers are purgative. The oil from the young branches is caustic, and is employed against ring-worm, and in cutaneous eruptions generally. The leaves are pungent. "It has been proposed as a cultivated field plant for yielding fibre, and it would produce well on poor, silicious soils, which are unfit for flax or corn. Its manufactured fibre

is clear, and as strong and soft as that of flax, but is deficient in length. The plant is of small value for forage." Rural Cyc.

SALT MARSH GRASS, (*Spartina glabra*, Muhl. Cat.) Charleston; Newbern.

Ell. Bot. 96. This plant is greedily eaten by horses and cattle; and though it affords a good pasturage for out-door stock, yet it is remarkable for a strong, rancid and peculiar smell, affecting the breath, the milk, butter and even the flesh of animals that feed upon it. During the blockade of Charleston it served as an important substitute for Northern hay; it is collected daily by negroes and sold in the streets; it is also valued as a manure.

REED BENT-GRASS, (*Ammophila arenaria*, *Calamagrostis.*) North Carolina; seashore.

This plant (*Arundo arenaria*) is the most valuable for planting on banks and on the seashore to prevent the encroachment of the water. It is planted in Holland for this purpose, and in Britain it is protected from destruction by law, on account of its great utility in enabling the sand to resist the action of wind and tide. *Elymus arenarius* is also protected in Scotland. Wilson.

OAT, (*Avena sativa.*) Cultivated in the Southern States.

See authors. Used as a food for horses. A gruel may be made of it, which is somewhat laxative, and which is employed in fevers.

WHEAT, (*Triticum.*) Extensively cultivated in the upper districts throughout the Southern States.

The best wheat for making bread is that containing the most gluten. That called Canada wheat in the United States has the highest rank; so Dr. Beck states in a paper on the subject of the value of breadstuffs, P. O. Reports on Agriculture. And yet Chaptal asserts that the wheat of southern countries contains more gluten than that of northern. Chaptal says that the next grains in order, yielding gluten, are barley, rye and oats. *Gluten* may be extracted, says Chaptal, from acorns, chestnuts, horse-chestnuts, apples, quinces, wheat, barley, rye, peas and beans; from the leaves of the cabbage, cress, hemlock, lovage and saffron; from the berries of the elder, the juice of the grape, etc. It is, however, contained in the greatest quantity in the grain of wheat, and it is from this that it is usually procured.

In order to extract gluten the flour of wheat must be kneaded into a paste with water; this paste must be afterward worked by the hand under a stream of water from a spout till the liquid flows off clear; the starch, sugar, and all the other principles contained in wheat which are soluble in water, are thus carried off, and there remains in the hands only a soft, elastic, glutinous, ductile, semi-transparent substance, adhering to the fingers after it has lost its moisture, and exhaling an animal odor; this substance is called gluten, or the *vegeto-animal principle.* There are some very nutritive vegetables, the author adds, in which the starch instead of being combined with gluten, as it is in the bread-corns, is united with mucilage; this is the case with peas, beans and potatoes. The flour of these will not alone make bread, but it is frequently used in years of scarcity, mixed with that of wheat to increase the quantity of bread. It is not unusual in the domestic economy of our plantations to have excellent bread by combining the sweet potato (*Convolvulus*) with wheat flour. An agreeable, sweet taste is thus imparted to the bread. The flour of rice, which may be ground in an ordinary coffee mill, is also used in the same way.

The wheat used in making *Starch* in England is either entire or coarsely bruised, and is steeped in cold water till it swells and yields by pressure a milky juice; it is then subjected to pressure in coarse bags placed in vats filled with water. When all the milky juice is expressed the bags are removed, the fecula gradually subsides to the bottom, and the supernatant liquid soon ferments and suffers a resolution of the principles dissolved in it into alcohol and acetic acid. The whole, after fermentation, is poured into tubs called frames, and after the fecula subsides in these, the supernatant liquid is poured off—the upper part of the sediment, being dirty and discolored, is scraped off—and the rest of the sediment, constituting the main bulk and purest portion of the fecula, is repeatedly well washed, pressed in cloths, and dried by a gentle heat; during the process of drying it so contracts as to form itself into the somewhat regular, small, six-sided columns in which it is sold in the shops. In this comparatively pure state it is of course less suited as an aliment than sago, arrowroot, etc. Wilson's Rural Cyc. Consult, also, Ure's Dic. Arts. In South Carolina wheat flour starch is preferred to that procured from the potato. Rice makes an excellent starch. Parched wheat, rye and corn have

been used, as was said, as substitutes for *coffee*. The following is offered by a correspondent:

"*The best Substitute for Coffee*.—Take rye, boil it, but not so much as to burst the grain, then dry it either in the sun, on a stove, or a kiln, after which it is ready for parching, to be used like the real bean. Prepared in this manner it can hardly be distinguished from the genuine coffee. The rye when boiled and dried will keep for any length of time, and consequently can be done at some convenient moment, so as to have it ready whenever wanted for parching." During the war it was more extensively employed as a substitute for coffee than any other material. See "Okra."

Wheat straw when burned yields a large amount of alkali, and is useful for making soap.

Ctenium Americanum, Spreng. *Monocera aromatica*, Ell. Low pine barrens; Florida to North Carolina.

The root of this grass is aromatic and highly pungent.

FLOATING SWEET MEADOW-GRASS; WATER FESCUE, (*Glyceria fluitans*, *Poa* of Ell. Sk. *Festuca* of Linn.) Grows in the upper districts; Newbern. Fl. Aug.

Dém. Élém. de Bot. iii, 307. It furnishes a species of manna. Wilson states that it will yield a considerable produce even on common undrained land. It constitutes a valuable forage for animals. Its seeds form a common and enriching food for fresh water fish, for aquatic fowl, and when gathered and dried they constitute the manna-croup of the shops, and are extensively used as an agreeable and highly nutritious material for soups and gruels. The seeds are shaken out over pieces of cloth. Rural Cyc.

TRUE BLUE GRASS, (*Poa compressa*, L., and *P. pratensis* of others.) Both good grasses; growing in Florida, and throughout the Southern States.

The True Blue is considered, says Dr. Lee, Editor of the Southern Field and Fireside, March 8, 1862, as the plant the very "best adapted to stop washing and store up fertilizers in their growth, for feeding stock, and yielding rich manure." It does not require replanting, and grows well on poor granite hills. It prevents all abrasion of the turf by the heaviest rains. It is also not difficult to subdue with the plow. "It makes a good sod and very fertilizing turf, and thus fattens the land, and fattens

all kinds of farm stock." These perennial grasses enrich the land more than forest trees, because "they approximate grain and flesh in their chemical composition more than forest leaves. Cattle that will starve on oak and pine leaves will wax fat on blue grass." See, also, "Southern Homestead." Consult Dr. Lee's editorials in Southern Field and Fireside, 1861, for much information on the grasses best to be used as fertilizers and for food and manure. He recommends the "tall Oat grass" (*Arrhenatherum avenaceum*) and the Texas Mesquit grass (*Holcus lenatus*) introduced from England, called also Velvet grass and white Timothy. The "Bermuda grass" is very pertinacious, and is excellent in eradicating nut-grass.

Among the grasses useful for *hay* are the herds'-grass, timothy, orchard and clover. See, also, Southern Field and Fireside, May 4, 1861, for article on "Stalks of corn as substitutes for hay."

Wilson states that the juice of the upright variety of *Poa* consists almost entirely of pure *mucilage*. Rural Cyc. Consult papers on the "Grasses," "Hay," etc., Sinclair's Hortus Gramineus Woburnensis, Loudon's Encyclopœdia, etc., for a full account of the relative value of grasses. Salt is often mixed with hay which has become wet, as a restorative; it is then much relished by cattle.

FESCUE GRASS, (*Festuca duriuscula*, L.) Introduced.

Several species of *Festuca* grow within the limits assigned to me. See botanical authorities. Wilson's Rural Cyc. states that this is one of the best of the native grasses of England for general utility. It thrives there on widely different kinds of soil, yields a moderately large bulk of produce, maintains much of its verdure in winter, and resists the usual withering effects of excessive drouth and heat in summer. It is well adapted by its winter verdure and fine foliage for forming the sward of parks and the herbage of ornamental sheepwalks; and when raised on a thin, healthy soil, or on poor, silicious sand, it has culms of so very fine and slender a form as to appear well suited to the straw hat manufacture. See *op. cit.* and the Woburn Experiments. This grass would likely be serviceable when planted on land subject to inundation.

CANE, (*Arundinaria gigantea*, *macrosperma*, Mx.) Banks of large rivers; Lawson in his travels in the Carolinas, says it does

not grow north of the James River; confirmed by Nuttall. Croom's Cat.

The cane and reed (*A. tecta*, Muhl.) are well known and used for many purposes: sometimes slit and made into chair bottoms, weavers' shuttles, and wherever a round, hollow wood is required for cheap tubing, etc. Mills states, in Statistics of S. C., that the leaves impart to wool a fine green color. The canes attain a great height and size on our river courses, and are a characteristic growth; they once grew luxuriantly throughout the upper country of South Carolina and Georgia, whence the names of many of the creeks and rivers, but have been almost entirely consumed by animals. See, also, the "History of the upper country of South Carolina," by Mr. Jno. Logan, Ch. 1860.

The Wilmington (N. C.) Journal, 1868, states that the "Cape Fear Fibre Company" has been established for the manufacture of *Paper stock* from our native cane or reed. It is calculated that this machinery will enable them to "blow out" about fifty tons of the paper stock per day.

The mode of treating the cane is as follows: "Tightly compressed bundles of it are put in the steam-cylinders or guns and then subjected to the action of steam, at a pressure of about one hundred and seventy pounds to the inch, for about ten minutes. The gums and glutinous matter which holds the fibres together, are thereby dissolved, or softened; and whilst in that state the cane is blown into the air by the force of the steam in the gun, and the fibres are separated by the expansion of the steam among them." The fibres are shot against a large target with considerable force, and the discharge resembles that of artillery. A battery of ten steam guns of the smaller size, twenty-four feet long and twelve inches in diameter, will yield over fifty tons of brown cane per day. No delicate machinery is required, nor skilled workmen. The company propose in the course of time, manufacturing box board, which article they can place in market at ten dollars less per ton than manufacturers who use straw can sell it. The paper made from the fibres of the cane is coming generally into use, and has achieved a world-wide reputation. The cane in this section is inexhaustible.

CHESS, (*Bromus secalinus*, W.) Dr. McBride found it in St. John's, Charleston District. Fl. July.

Flora Scotica, 1087. This is the plant which is said to render the seeds of wheat bitter. Mér. and de L. Dict. de M. Méd. i, 672; Journal Gén. de Méd. lxxxviii, 82; Shec. Flora Carol. 297. A good green dye is extracted from the flowers. Griffith Med. Bot. 662. M. Cordier finds that it is bland in its action; it was once thought to possess purgative powers.

CATHARTIC BROMUS, (*Bromus purgans*, L.) Mountains of N. and S. C. Fl. August.

Mér. and de L. Dict. de M. Méd. i, 672. It was said to be anthelmintic, and that forty grains would produce vomiting. Effect uncertain.

AMERICAN ORCHARD-GRASS; CLUSTERED DACTYLIS, (*Dactylis glomerata*, Linn.) James Island, near Charleston. Fl. July.

Shec. Flora Carol. 492. This is the species instinctively sought after and swallowed by dogs and cats when they are inclined to vomit, or to envelop the splinters of bone collected in their stomachs. "It is a valuable grass, and ought to be cultivated with care."

CYPERACEÆ. (*The Sedge Tribe.*)

They contain very little fecula or sugar.

JOINTED CYPERUS, (*Cyperus articulatus*, Mich.) "Grows on Hilton Head Island, at Ogeechee," Ell.; vicinity of Charleston. Fl. July.

Mér. and de L. Dict. de M. Méd. ii, 567. In Guinea this is considered one of their remedies for worms.

Cyperus odoratus, L. River banks; vicinity of Charleston. Fl. August.

Lind. Nat. Syst. Bot. 385. The root has a warm, aromatic taste, and the infusion is given in India as a stomachic. Ainslie, Mat. Med. Ind. 288.

SHARP GRASS, (*Cyperus virens*, Mx.) If incautiously drawn through the hand, the stem will cut severely with its sharp angles.

GRASS NUT, (*Cyperus repens.*) The nut or root of this is sweet, and is cultivated and sold in Charleston as an edible nut. Mr. Coming, of Charleston, proposes to plant it as a food for hogs.

NUT GRASS, (*Cyperus hydra*, Mx.) St. John's; Newbern. Prof. Holbrook informs me that Gen. Pinckney told him it was introduced, though Elliott does not mention it. Its reproductive power is marvellous, and hence it is a great scourge to the planter, depreciating the value of land. It is with difficulty eradicated by constant hoeing; by this process in its constant efforts to throw its leaves to the light the root becomes exhausted. The experiment has been successfully tried by J. McQueen, Esq., of Georgia, Ell. The destruction of the seed is also thus secured.

A correspondent "G," of the So. Agriculturist, proposes the following plan for eradicating nut grass, which he has successfully used:

1st. Deep winter plowing—not scratching with a small single horse plow, but plowing to the depth of at least eight inches—even twelve, or more if possible—also frequent and thorough harrowing, or the use of the cultivator during the winter months, so that the tubers and stoloniferous fibres of the plant may be brought to the surface, and exposed to the frost. They need have no fears of injuring their lands by deep plowing, provided they furnish them with an adequate supply of manure.

2d. To put such crops upon the ground as will admit of its being frequently stirred during the growing season, with the plow and the cultivator—especially the latter instrument. By the adoption of this course, we will venture to predict, that in a few seasons they will have the satisfaction of seeing one of their most troublesome enemies effectually vanquished. The tubers are disseminated by hogs, crows and rats.

H. W. R. has never seen the seeds mature in S. C., though the seed vessels are formed.

MARITIME SCIRPUS, (*Scirpus maritimus*, L. *Scirpus macrostachyus*, M.) Marshes; "Little Ogeechee bridge, seven miles from Savannah," Ell. Collected in St. John's; vicinity of Charleston. Fl. June.

Dém. Élém. de Bot. ii, 292. Aromatic, and slightly nutritive.

BOG MARITIME SCIRPUS; MARSH CLUB-RUSH, (*Eleocharis palustris*, R. Brown. *Scirpus palustris*, Linn. and Ell Sk.) Grows in rice-fields, often immersed. Collected in St. John's; vicinity of Charleston. Fl. June.

Mér. and de L. Dict. de M. Méd. vi, 262. Lemery says the roots are astringent, and that they are employed in decoction in diarrhœa and hemorrhage. It is much used in Europe in the manufacture of chairs, mats and delicate work, and I would invite the attention of those engaged in similar operations in this country.

Carex acuta, L. Grows in bogs in the upper districts, often immersed, Lightfoot; Newbern. Fl. April.

Fl. Scotica, ii, 566. In Italy the leaves are used by glass-makers to bind their wine flasks, and in the manufacture of chair bottoms; also by coopers to place between the seams of cask heads to render them air-tight. The *Typha latifolia* and *Scirpus lacustris*, both found in the Southern States, have been used for this purpose. (See these plants.) The makers of turpentine barrels might find them convenient and valuable, supplying the place of the strip of wood shaving I have seen some of them employ.

Class IV. RHIZANTHS.

Class V. ACROGENS, OR FLOWERLESS PLANTS.

In this volume I pass over very lightly the *Cryptogamia, Filices, Lichenes, Musci and Algæ*, the Ferns, Lichens, Mosses, etc., referring the reader for full details to my Report before the Am. Med. Assoc. vol. vii, on the "Medicinal, Poisonous and Dietetic Properties of the Cryptogamic plants of the United States," a volume of one hundred and twenty-six pages.

The leaves of Ferns, one of the subdivisions of this class, generally contain a thick, astringent mucilage, with a little aroma; on which account they may be considered pectoral and lenitive. Lindley states that almost any of them may be substituted for the *Adiantum pedatum*, and *A. capillus veneris*, which especially abounds in these products. The first of these grows in shady woods, North Carolina and northward, and the second is often pendant from limestone cliffs, Florida, Alabama and westward. They form the basis of the syrup called *capillaire*, so much used in France and Germany. Ainslie states that

a strong decoction of the last is decidedly emetic. I have observed in the leaves of the *Osmunda regalis*, and of several other species, a taste strongly resembling that of *spermaceti*.

Peat being a vegetable production is worthy of attention, and accumulations of it may be found by those who seek for it. A company is said, 1867, to be working and collecting it in the Dismal Swamp, N. C., and it will no doubt be found wherever grasses and minute water plants have been allowed to grow undisturbed for a great number of years. I have known the soil forming the substratum of fresh water ponds in St. John's Berkeley, S. C., to take fire during particularly dry seasons and burn for weeks till extinguished by rain, or when the whole combustible material had been consumed. I have no knowledge of the depth which such vegetable accumulations had acquired, but were it not for the frequent firing of the pine land which surrounds these partially submerged ponds and swamps, the formation of peat would be much more abundant. The writer would not be surprised to learn that the examination of the margins of many of our pine land ponds, particularly those generally holding water and where the grasses and confervoid plants were allowed to grow, would reveal a large supply of combustible earth. This might be cut and exported, or used as fuel.

The plant which seems to abound most in such ponds and low pine lands, and which, I think, is a principal component, seems to be a very delicate one with leaves matted very thickly together, probably a club moss, (*Lycopodium.*)

I have examined a bed of peat six feet thick, covering an extent of about a quarter of an acre. This is not more than a hundred yards from the steamboat landing at Mt. Pleasant, on the Cooper River, opposite Charleston, and strange to say is very near the salt water. Much larger deposits exist in the neighborhood. I have also received very rich specimens of peat from Dr. St. Julien Ravenel, extensive deposits of which he has examined near the Ashepoo and Pon Pon Rivers, S. C. I see, also, in Rep. on the Geolog. of Arkansas, that it is found in great abundance in that State. Sir C. Lyell, in his "Geology," was inclined to question its presence in the warmer latitudes, and Prof. C. Jackson, of Boston, says it is not found at the South.

A paper on the "Value and Uses of Swamp Muck," by Simeon Brown, of Mass., is published in P. O. Rep., 1856, which furnishes instructions for handling it.

Lands containing these muck swamps, formerly regarded as nearly worthless, have greatly advanced in value. When it is thrown out and becomes dry it is friable, and falls into a light, fine powder, which is greedily absorbed by plants. It is for the most part vegetable in origin, and made up of the annual deposits of grasses, shrubs and mosses, with contributions of mineral and silicious matter and the addition of leaves from the forests.

It has received the name "humus" earth, or mould. Stöckhardt says: "By the general term 'humus' we must understand a mass of brown, decaying matter, partly soluble, partly insoluble, partly acid and partly neutral, which, with the uninterrupted presence of air, water and heat, may be still farther decomposed and carbonic acid and water thereby evolved. Carboni accid and water are indispensable to the nourishment of plants; hence in a soil rich in humus, the plants will grow more vigorously, because they find these and can absorb by their rootlets more of these two nutritive substances than they could in a soil poor in mould. Humus exerts, moreover, a beneficial influence upon vegetation, because it loosens the soil by the development of carbonic acid; because it possesses the power of attracting water from the air, and of retaining it for a long time, and because by means of the acids contained in it, it is able to abstract ammonia from the air, and also from manure, the third means of nutriment of plants."

Muck is cut, exposed to the air, and sometimes mixed with bones which have been dissolved by a solution of sulphuric acid, with lime, ashes or salt and ashes or guano, and composted with stable manure, and then applied to lands as a fertilizer. It is an excellent deodorizer or absorber, and is used also as a litter for stables.

EQUISETACEÆ. (*Horsetail Tribe.*)

HORSETAIL, (*Equisetum lævigatum.*) North Carolina and northward. The seeds of the horsetail are remarkable for hygrometrical movement. They contain a great deal of silica.

The dried stems of *E. hiemale* and *E. arvense* are imported from Holland for cleaning wooden utensils and polishing cabinet work, turnery, and metallic wares. "This plant might be profitably cultivated for the use of turners, cabinet-makers and other artificers." Wilson's Rur. Cyc.

POLYPODIACEÆ.

Polypodium vulgare, L. It was formerly thought to be possessed of great virtues in obstruction of the liver, and was said to be expectorant and diuretic—rhizome used.

BRAKE, (*Pteris aquilina*, L.) Grows in damp pine lands; sent to me from Abbeville District by Mr. Reed; collected in St. John's; vicinity of Charleston; Newbern. F July.

Dém. Élém. de Bot. iii, 347. The root is vermifuge and astringent; and is said to be a remedy for the tape-worm, one ounce of the decoction being used at a dose. This plant contains a very large proportion of alkali. Fl. Scotica, 656. Its ashes will yield double the quantity of salt afforded by any other plant—forming, therefore, a manure adapted to potatoes. Made into balls with water, it is employed to wash linens. The astringency is so great as to render it useful in preparing leather and kid gloves.

Wilson, in his Rural Cyc., says that the main interest in British ferns is concentrated in the *Pteris*, and as it is abundant in the Southern States, I will condense his remarks: it was formerly, he says, in great request for thatch, and usually lasted in that capacity eight or nine years on the north side of a roof, and fifteen or sixteen years on the south side; but, except in the meanest hovels, it has been superseded by heath, straw, tiles and slates. It was formerly used in considerable quantity in both the glass and the soap manufactory, but cheaper and better articles have since supplied its place; still in the Southern States we may find it useful as a material for a supply of potash and in making lye. The plant also possesses tannin. It is used as a fuel for heating ovens and burning lime; it forms good litter to protect esculent roots in pits during winter. In England the rank growth of the brake is destroyed by irrigation. The leaves of ferns are found to be excellent for packing fruit, etc., for market.

MAIDEN HAIR, (*Adiantum pedatum*, L.) It yields a useful syrup, called by the French "capillaire," which is a refreshing beverage mixed with water in fevers. Farmer's Encyc.

LYCOPODIACEÆ, (*Lycopodium clavatum*,) L. Mts. of N. C. and northward.

The decoction is given in a variety of diseases as a diuretic and anti-spasmodic. The powder is emetic, but is principally employed in place of starch to prevent excoriations in young children. It is also said to be the most efficacious application in cases of Plica polonica. Griffith.

Lycopodium selago, L. High Mts. of N. C. and northward.

It is regarded as very active, and some cases of poisoning with it have been recorded; in small doses it acts as an emeto cathartic, and in over quantity like the acro narcotics. A decoction is employed in Sweden to destroy vermin on domestic animals. When mixed with lard it forms an irritating ointment, which has been used as a dressing to ulcers and to keep blisters open. Griffith.

OSMUNDACEÆ.

ROYAL FERN; FLOWERING FERN, (*Osmunda regalis*, Mx.) Grows in damp soils; collected in St. John's. Fl. July.

Wade's Pl. Rariores, 87. Dr. Stokes says that impressions of this fern are observed in nodules of iron-stone in the Colebrookdale iron-works, and that it is the only species of an indigenous (European) vegetable which has ever been found in a fossil state, all others being of American growth. Withering, Supplem. to Mér. and de L. Dict. de M. Méd. 1846, 536. It is sometimes employed in dropsy, as an astringent in injuries, and by Dr. Heidenreich in the radical cure of hernia; he reports fifty cases ("guéris radicalement") after the method of Simon: giving the root in wine internally, and placing upon the hernial ring compresses which have imbibed the decoction of the plant. Journal de Chim. Méd. viii, 395, second series, 1842. In the Dict. Univ. de M. Méd. v, 113, its employment in this affection was spoken of. Hermann boasts of it as having a direct action upon the intestinal canal, which it purges mildly in doses of two to four drachms of the powder. It acts upon the bile, augments digestion and strengthens chylification. The extract

has been thought peculiarly suited to cases of children affected with caries, mixed in milk or water, and continued for some time. Aubeil's Obs. sur l'emploi de l'Osmund, Journal Gén. de la Soc. de Méd. xlvi, 59, 1843. Lindley, in his Nat. Syst. Bot. 400, states that it "has been employed successfully in doses of three drachms in the rickets." The leaves have been selected to make cradles for delicate children, from some supposed good effects derived from their use. Encyclop. Meth. Botanique, iv, 652. The strong resemblance which I have noticed between the taste of this species and *spermaceti* is quite marked. The plant seems scarcely to be known in this country, and I observe no notice of it in the American works.

ALGÆ. (*Inarticulatæ.*)

SEAWEEDS, (*Fucus serratus* and *F. vesiculosus.*) *Iodine* exists most abundantly in most species of *Fucoideæ*, which form the greatest part of the sea-weeds of our coast. I extract the following from Wilson's Rural Cyc., in order that so useful a substance may be made in the Southern States, and also refer the reader to the plants furnishing iodine, which are treated of in my paper in the seventh volume Am. Med. Assoc. Iodine also occurs in the sponge, and in many moluscous animals. But it is from the incinerated seaweed or kelp that the iodine in large quantities is obtained. As the soap manufacturers are in the habit of obtaining their soda from kelp, iodine may be procured very economically from the residuum of their operation, according to the process invented by Dr. Ure, which is as follows:

The brown iodic liquor of the soap-boiler, or the solution of kelp from which all the crystallizable ingredients have been separated by concentration, is heated to about 230° Fahr., poured into a large stone-ware basin and saturated with diluted sulphuric acid. When cold the liquor is filtered through woollen cloths; and to every twelve ounces (apothecary's measure) is added one thousand grains of black oxide of manganese in powder. The mixture is put into a glass globe or large matrass, with a wide neck, over which a glass globe is inverted, and heat is applied, which causes the iodine to sublime copiously, and to condense in the upper vessel. As soon as the balloon be-

comes warm another is substituted for it; and when the second becomes heated the first is again applied. The iodine is withdrawn from the globes by a little warm water, which dissolves it very sparingly; and it is purified by undergoing a second sublimation. The test made use of for the detection of iodine in any solution is, it is well known, starch; sometimes a few drops of sulphuric acid should be added, and a blue color is obtained if iodine be present. See Rural Cyc. Ure's Dict. and works on Chemistry and Mat. Medica.

Kelp is obtained from the two *fuci* mentioned above, from which also soda is obtained. I will insert the process as given by Wilson, in order that it may be better known by those living on our coasts. He says that on the Scottish coast the seaweed is cut close to the rocks during the summer season, and afterward spread out upon the shore to dry, care being taken to turn it occasionally to prevent fermentation. It is then stacked for a few weeks, and sheltered from the rain, till it becomes covered with a white, saline efflorescence, and is now ready for burning. This is usually accomplished in a round pit lined with brick or stone; but the more approved form for a kiln is oblong, about two feet wide, eight to eighteen long, and from two to three deep. The bottom of this is covered with brush, upon which a little dried seaweed is now thrown gradually as fast as the combustion reaches the surface, and should there be much wind it is necessary to protect it by covering the sides with sods; after the whole is burnt the mass gradually softens, beginning at the sides, when it should be slowly stirred up with a heated iron bar, and incorporated till it acquires a semi-fluid consistence. This part of the process requires considerable dexterity, and if the mass continues dry a little common salt should be thrown on, which acts as a flux. When cold it is broken up, and is now ready for sale. Notwithstanding, the author adds, that kelp contains but two or three per cent. of carbonate of soda, while Spanish barilla often contains twenty or thirty, [see "*Salsola*" and "*Salicornia*,"] the manufacture of this article during the Continental war increased prodigiously. Stones were placed within the flood-mark of sandy shores, which became covered with seaweed. Potash will often supply its place, but soda is indispensable to the making of plate and crown glass and all hard soaps. The barilla is obtained in

France from *Salicornia annua*, which yields fourteen per cent. of soda. In the Southern States we have species of all the genera yielding soda and potash, viz: *Salsola*, *Salicornia*, *Statice*, *Atriplex* and *Chenopodium*, all embraced under the family *Chenopodiaceæ*.

"Seaware," or seaweed, cast upon the shores is largely collected and used as manures. They contain a large proportion of nitrogenous and saline matters, with earthy salts in a readily decomposable state. They also contain much soluble mucilage.

GLOIOCLADÆ.

Palmella. Dr. J. H. Salisbury has published a very remarkable paper, with plates, in the Am. Journal Med. Sc., for January, 1866, on the cause and pathology of intermittent and remittent fevers, in which he ascribes them to the invariable and constant presence of two or three species of palmella. He asserts that he recognizes the Palmella in earth, growing near the localities where the fevers prevail—that they cover the wet earth or margin of ditches like a yellow powder, and that he has breathed the sporules of the palmella and taken the fever, and that by eradicating them such fevers disappear. By consulting Payer's Botanique Cryptogamique it will be seen that palmella, like Protococcus, or red snow, is one of the minutest forms of vegetable life, so that the sporules are very minute. Dr. S. declares, "so far as I have examined, (and my observations have been widely extended,) I have never found a case of ague *in situ* where I did not find the plant, (three species of palmellæ, or palmelloid plants, one green, another red, a third lead color,) growing near; and, *vice versa*, I have never found these plants growing in any locality but that (if such locality was inhabited) intermittent or remittent fever, or both, prevailed in proportion to their extent and profusion." A writer in the Belgian Med. Journal confirms these statements, but no medical observer in the country has yet substantiated them.

After reading the article I sought for the palmella in a locality near Statesburg, S. C., where malarial fevers existed, particularly in a large fresh water pond which seemed to be the source of the disease, but could discover no evidence of the existence of palmellæ. Time will be required to decide this question. I feel confident that I know localities where malarial fevers arise, and where such plants do not co-exist. See J. K. Mitchell's treatise

on the "Cryptogamic Origin of Malarial and Epidemic Fevers," and my Report to the Am. Med. Assoc. on the "Medical and Poisonous Properties of the Cryptogamic Plants of the United States."

In a very extensive Catalogue of the plants growing in North Carolina, embracing nearly three thousand species of the flowerless plants, which I have just received (1869) from the author, the Rev. M. A. Curtis, of Hillsboro', there is only one species of palmella cited, (*P. prodigiosa*, Mont. on cooked vegetables,) and *Protococcus viridis*, Ag., growing on the bark of limbs.

Prof. H. C. Wood, of Philadelphia, in an able paper in Am. J. M. Sc., October, 1868, combats most forcibly the views of Salisbury and others. He placed masses of palmellæ in a solution of the sulphate of quinia of the strength of one grain and a half to the ounce. The quinia exerted no unhealthy influence whatever upon them. He considers that Prof. S.'s descriptions of his genera and species are too vague and destitute of character to allow that the question of identity should be settled by them, and he states that Prof. Leidy has slept for months with various species of palmellæ growing in masses near his bed, and that he himself had lived with them and swallowed them purposely, and by accident, by thousands, and yet, in neither case, has any trace of intermittent made its appearance. I have examined, under the microscope, species allied to palmellæ sent to me by Mr. Ravenel, which might well escape the attention of any but those accustomed to researches among the very lowest order of vegetable life.

FUNGI, OR FUNGACEÆ. (*The Mushroom Tribe.*)

These are many species among these allowed the possession of medicinal virtues of a high order as well as of great value in the arts, and a rich field is open to the investigator in these interesting departments of Natural History and Indigenous Medical botany. I am compelled to refer the reader for details to the paper before mentioned.

EDIBLE MUSHROOM, (*Agaricus campestris.*)

The reader will find in my report to the American Med. Association, vol. vii, 1854, on the Medicinal Properties of the Cryptogamic Plants of the United States, a full and elaborate

account of the Edible, Poisonous and Medicinal Fungi. H. W. Ravenel has a paper on the "Edible Mushrooms of this country," read before the Aiken Vine Growing and Hort. Assoc. S. C. See, also, Roques' treatise, "Champignons Comestibles," Paris. Mr. M. A. Curtis, of North Carolina, has in the hands of the printer descriptions with drawings of fifty American species of Edible Mushrooms. I introduce portions of a paper from the Patent Office Reports, 1854, on the mode of cultivation of the mushroom:

"The kind most generally cultivated in the gardens is the '*Agaricus campestris*,' which is thus described by McMahon: 'The gills of this are loose, of a pinky red, changing to liver color in contact but not united with the stem; very thick-set, some forked next the stem, some next the edge of the cap, some at both ends, and generally in that case excluding the intermediate, smaller gills. Cap white, changing to brown when old, and becoming scurfy, fleshy and regularly convex, but with age flat and liquefying in decay, flesh white, diameter commonly from one inch to three, or sometimes four or more. Stem solid, one to three inches high, and about one inch in diameter.' Loudon says: 'The mushroom is a well known native vegetable, springing up in open pastures in August and September. It is most readily distinguished when of middle size by its fine pink or flesh colored gills and pleasant smell; in a more advanced stage the gills become of a chocolate color, and it is then more apt to be confounded with other kinds of a dubious quality; but that species which most nearly resembles it is slimy to the touch, and destitute of the fine odor, having rather a disagreeable smell. Further, the noxious kind grows in woods or on the margin of woods, while the true mushroom springs up chiefly in open pastures, and should be gathered only in such places.' Armstrong gives the following directions for cultivating the garden mushroom: 'Prepare a bed early in October, either in a corner of the hot-house, if you have one, or a dry and warm cellar. The width of the bed at the bottom should not be less than four feet, and its length in proportion to the spawn provided. Its sides should rise perpendicularly one foot, and should afterward decrease to the centre, forming four sloping surfaces. We need hardly say that the material

of the bed at this stage of the business must be horse-dung, well forked, and pressed together, to prevent its settling unequally. It should then be covered with long straw, as well to exclude frost as to keep in the volatile parts of the mass, which would otherwise escape. After ten days the temperature of the bed will be sufficiently moderated, when the straw is to be removed, and a covering of good mould to the depth of an inch laid over the dung. On this the seed or spawn of the mushroom (which are threads or fibres of a white color, found in old pasture grounds in masses of rotten horse-dung, sometimes under stable floors, and frequently in the remains of old hotbeds) is to be placed in rows six inches apart, occupying all the sloping parts of the bed, which is again to be covered with a second inch of fresh mould and a coat of straw. If your bed has been well constructed your mushrooms will be fit for use at the end of five or six weeks, and will continue to be productive for several months. Should you, however, in the course of the winter find its productiveness diminished, take off nearly all the original covering, and replace it with eight or ten inches of fresh dung, and a coat of clean straw. This by creating a new heat will revive the action of the spawn, and give a long succession of mushrooms.' The garden mushroom is eaten fresh, either stewed or boiled, and preserved as a pickle, or in powder, or dried whole. The sauce, commonly called 'ketchup,' is or ought to be made from its juice with salt and spices. Wild mushrooms from old pastures are generally considered as more delicate in flavor and more tender in flesh than those raised in artificial beds. But in the young or butter mushrooms of the cultivated mushrooms there is evidently much less risk of deleterious kinds being employed. The soil employed should be virgin earth with turf well reduced, neither too dry nor too wet, otherwise it will not be capable of being beaten solid. It must be laid regularly over the beds, two inches thick. From the time of earthing the room or cellar should be kept at a temperature of 50° to 55° Fahr. If higher it will weaken or destroy the spawn; if lower it will vegetate slowly, and if watered in that state numbers of mushrooms will be prevented from attaining perfection. Water must be applied with extreme caution, being nearly as warm as new milk, and sprinkled over the beds with a syringe or small water-

ing pot. Cold water destroys both the crop and the beds. If suffered to become dry it is better to give several light waterings than one heavy one. Beds thus managed will bear for several months, and a constant supply kept up by earthing one bed or more every two or three months. If when in full bearing the mushrooms become long stemmed and weak the temperature is certainly too high, and air must be admitted in proportion as the beds decline. To renovate them the earth must be taken off clean; and if the dung is decayed the dung must be reformed, any good spawn being preserved that may appear; but if the beds be dry, solid and full of good spawn, a fresh layer of compost three or four inches thick may be added mixed with a little of the old, and beaten solid as before."

Mushrooms may be grown in a cellar or other vaulted place with equal success, and not unfrequently with greater advantage, the same rules being adopted; but no fire is necessary, and less water. *Antidote to poisonous sorts:* all fungi should be used with great caution, for even the edible garden mushrooms possess deleterious qualities when grown in certain places. All the edible species should be thoroughly masticated before taken into the stomach, as this greatly lessens the effects of poisons. When accidents of this sort happen, vomiting should be immediately excited, and then the vegetable acids should be given, either vinegar, lemon juice, or that of sour apples; after which give ether and anti-spasmodic remedies to stop the excessive bilious vomiting. Infusions of gall nuts, oak bark, and Peruvian bark are recommended as capable of neutralizing the poisonous principle of mushrooms. It is, however, the safest way not to eat any of the good but less common sorts, until they have been soaked in vinegar. Spirits of wine and vinegar extract some part of their poison; the tannin matter decomposes the greatest part of it.

The following is a method of raising mushrooms by a gentleman, "R. C." of Beaufort, S. C., which I obtain from an agricultural paper. "I send you a method of raising mushrooms, by which I have very unintentionally succeeded in producing an abundance each spring, for the past three years, and sometimes during the winter and fall: fence in a spot; strew litter trash from the woods in it, say one or two inches thick, and shut up stock cattle in it every night for a week or two, any time be-

tween January and June. Let the manure remain untouched, and in the fall or winter, if the weather proves mild, an abundance of mushrooms will be produced, which may be eaten without any fear, as only edible ones will grow."

The common mushroom found in yards and fields, which may be known by its delicate pink color on the under surface, turning black as it decays, is frequently eaten at the South, and is a delicious vegetable when stewed with milk and seasoned.

A discovery was made some few years since that two or three species of agaricus form by deliquescence an inky fluid which dries into a blister colored mass, is capable of being used as a water color for drawing, and retains its color in defiance of all the common chemical agencies. Dr. Coxe, of America, who put the discovery completely to the test, is disposed to think that the deliquescent fungi might be prepared into an excellent India ink; that its dried deposit, mixed with oil, might probably answer for engravings, and that as the ink appears to be indestructible by any agency short of burning, it might be tried for the filling up of bank notes and other valuable papers. The kinds of agarici which possess the inky property, appear to be those designated *ovatus*, *cylindricus* and *porcellaneus*. It is this property of blackening which enables us to separate the poisonous from the edible. Wilson's Rural Cyclop.

The Patent Office Reports, 1854, contain papers on the cultivation of the garden mushroom from Armstrong, Loudon, and others.

CEDAR APPLE, (*Podisoma juniperi*, *Podisoma macropus*, Schw.) Used as an anthelmintic.

Uredo segetum and *U. fetida*. *Smut* in wheat and corn is prevented by soaking the grains, before planting, for twelve hours in a solution of lime water, salt and water, or acids. The taste and smell of smutted wheat is disguised by molasses, hence it is often purchased by those making sweetened bread. See a full description in Wilson's Rural Cyc.

Œcidium, *Uredo*, *Puccinia*, *etc.* Minute parasitical fungi; attacking fruit trees, plants, etc. See article in Rural Cyc., and my Report on Medical and Poisonous Properties of the Cryptogamic Plants of the United States, Trans. Am. Med. Assoc. vol. vii; also, H. W. Ravenel's *Fungi Carolin. Exsicati;* Loudon's Encyc. of Plants; Sowerby's English Fungi, and Berkely's Crypt. of England.

TUCKAHOE; INDIAN BREAD OR INDIAN LOAF, (*Lycoperdon solidum, Pachyma cocos*, Schw.) I have collected it in the fields, St. John's, S. C. It is not mentioned by Chapman.

This curious subterranean development of abnormal vegetation, whether fungus or not, has been described by Clayton and LeConte, and by Dr. McBride, of South Carolina, in a communication to the New York Philosoph. Society. See, also, Med. Report, vol. vi. and Farm. Encyc. It is very probably nutritious. Its internal color is white; it resembles a brown loaf of coarse bread. I could not detect starch in it by the usual tests.

GIANT PUFF BALL, (*Lycoperdon giganteum.*) My correspondent, Mr. H. W. Ravenel, writes me as follows (1868) with reference to this immense eatable mushroom:

"It ought to be found in abundance about the Neck and near Charleston, particularly in the grassy lawns where the cattle are driven to graze. It is the largest of all the puff balls and is really a delicious thing. They are used sliced up and fried in butter, or stewed in milk and seasoned like the common mushroom. The plant is used when full grown and just before the transformation (morphosis) takes place, changing its texture from a white, pulpy substance to a dry purplish mass of minute spores. It has been mentioned by medical writers that the spores of the Puff balls have narcotic properties, and it is an anasthetic agent, acting somewhat like chloroform when inhaled, but I have never experienced any effects of the kind from its use as a vegetable. However, Dr. Harry Hammond, of Beech Island, S. C., writes to me, 'since writing to you, I and a number of others have made several meals on *Lycoperdon*, and I think I have discovered in myself well marked evidences of a narcotic influence—and two other experimenters have described similar sensations to me. I recollect also to have heard from Mr. Mahan, that a friend of his, a physician in Georgia, had been seriously affected in this way by two large a meal on Lycoperdon.'"

In order to invite the attention of our people to new sources of industry I append a list of some of our Native Plants which are now largely gathered in the mountain districts of Carolina, Georgia and Tennessee, and which find a ready sale in the

northern markets, at prices ranging from five to ninety cents. They will be taken by any wholesale drug house:

Ginseng, Sage, Indian Hemp, (Black,) Horse Mint, Boneset, Yellow Jessamine, Lady's Slipper, Pink Root, White Pond Lilly, Seneka and Virginia Snakeroot, Button Snakeroot, Lobelia, Herb and Seed, Yellow Dock, (*Rumex*,) Bark of Mt. Ash, Lemon Balm, Calamus, Dogwood Bark, Elder Bark and Flowers, Sampson Snakeroot, (Gentian,) American Safron, Sassafras Bark, Myrtle Wax, Cherry Bark, Cotton, Bark of Root, Peppermint, Pleurisy Root, Thorn Apple Leaves, White Hellebore, Prickly Ash Berries and Bark, Dandelion Root, Black Root, White Hellebore, Blood Root, Blue Flag, Bitter Root, Veratrum Viride, False Unicorn Root, (*Helonias Dioica*.)

TABULAR CALENDAR FOR THE GARDEN.

The following was published (by H. W. Ravenel, of Aiken, S. C.,) in the Aiken Press. It is suitable for the latitude of South Carolina and Georgia, showing the seasons for planting and the seasons for using vegetables, so as to have a constant daily supply through the year:

VEGETABLES.	WHEN TO BE PLANT'D.	WHEN FIT FOR USE.	REMARKS.
Asparagus.	Once planted, perennial.	March to May.	Injures the bed to cut after May.
Artichoke, globe.	Once planted, perennial.	April, May, June.	Suckers, set out in aut'n.
Artichoke, gro'nd.	Any time in winter.	October to March.	Good for the table and for pickling.
Beans, snap.	March to August.	May to October.	Plant at intervals for a succession.
Beans, Sewee or Lima.	March to May.	Midsummer to frost.	They may be put up for winter use.
Beets.	Feb., March, April.	May to September.	May be planted in July for winter.
Canteloup.	March, April, May.	June to September.	
Cab., green glas'd.	April, May.	November to March.	The seed must be pure to head.
Cab., sum. varit's.	Autumn or spring.	May and in midsummer.	Seeds sown in autumn must be protected during winter.
Collards.	April, May, June.	August to March.	
Carrot.	Feb., March, April.	Midsummer to next March.	
Cucumbers.	March, April, May.	May to September.	
Guinea Squash.	March, April, May.	July to frost.	
Kohl Rabbi.	Spring and summer.	Midsummer to next winter.	
Leeks.	Sow seeds in Feb., set out in June, July.	November to April.	To be earthed up as they grow.
Lettuce.	Jan., Feb., March, April.	March, April, May, June.	Cabbage lettuce is the best variety. Make the ground extremely rich.
Mustard.	July to November.	Following winter.	To be used as greens.
Melons.	March to June.	July to September.	
Onions.	Sow seeds in Mar. or plant young onions in Nov., Jan., Feb.	August, September, October. June, July.	Plants from seeds will keep through winter, those from sets will not keep.
Okra.	March to June.	July to frost.	
Peas.	December to March.	April to June.	Plant sec'd crop in June for succession.
Potatoes, Irish.	February to April.	June to October.	Plant for a succession of crops.
Peppers.	March, April.	Summer and fall.	Goodrich's seedlings the best.
Parsnips.	March, April.	Following winter.	
Radish.	March to August.	April and through the summer.	Used green or ripe.
Ruta Baga.	July, August.	Following winter.	Plant frequently for a succession.
Spinach.	September, October, November, Dec.	November to April.	May be planted in April for summer crop.
Squash, early.	February to April.	May to August.	Soil must be extremely rich.
Squash, Potato or Coosaw.	April, May, June.	Midsummer to frost.	Keep well through the winter.
Salsify.	March, April.	Following winter.	
Turnips, spring.	February, March, April.	May to July.	
Turnips, winter.	July, August.	November to March.	Plant second crop not later than July.
Tomatoes.	February to July.	July to frost.	

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CATALOGUE

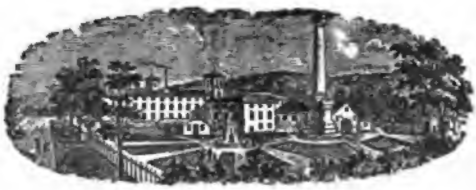
OF

PURE

MEDICINAL PREPARATIONS

Prepared in Vacuo.

BY



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176 WILLIAM STREET, NEW YORK.

1869.

Acid, Carbolic.—*Crystals, Pure and Solution.*—Carbolic acid is an escharotic stimulant, rubefacient and antiseptic. It possesses very important disinfecting, deodorising and antiseptic powers. Its specific action upon all organic and inorganic matter preserves it from putrefaction and decay. In addition to these properties it acts when locally applied, as an escharotic, or diluted, as a stimulant; when given internally it resembles Creasote in its power of allaying several forms of vomiting and gastric irritability. Dr. Godfrey found benefit from its use in vomiting in pregnancy, flatulency of old age, diarrhœa, putrid discharges from the mouth, throat, ears, rectum and vagina. It is used as a gargle in stomatitis, aphthæ, diphtheria and ulcerated sore throat, as a wash in ill-conditioned ulcers, sloughing wounds, cancerous ulcerations, fetid perspiration of feet, or as a disinfectant for fæcal matter, contagion of sick room, cess-pools. See Jour. Materia Medica, vol. 6. Dose, internal, one drop. One drop of the deliquesced acid largely diluted in water, and one teaspoonful of the solution.

Acid, Chromic.—Used as an escharotic in syphilitic vegetations, in ulcerations, warts and morbid growths; gives less pain than other caustics, acts as a rapid solvent of organic matter. See Jour. Materia Medica, vol. 2 and 6.

Ammonia, Aqua Fortior.—The gas constitutes 26 per cent. of the solution Too strong for medicinal use in its unmixed state.

Ammonia, Aromatic Spirits of.—Stimulant and alexipharmic. Medicinal properties bear a close resemblance to those of the simple spirits. It is a weaker preparation and has generally gained the preference with physicians on account of its grateful taste and smell. It is advantageously employed as a stimulant antacid in sick headache. Dose, thirty to sixty drops properly diluted with water.

Ammonia, Hypophosphite of—Stimulant tonic. One of the agents recommended in the treatment of pulmonary tuberculosis, and is indicated in that class of maladies characterized by a want of nervous tone and integrity, and in some types of mental aberrance and defective osseous formation. Dose, ten to thirty grains.

Ammonia. Spirits of.—Spirits of ammonia are stimulant, anti-spasmodic and alexipharmic. Ammonia is adapted for speedily rousing the action of the vascular and respiratory systems and for the prompt alleviation of spasms. In languor, hysteria, flatulent colic, syncope nervous debility, and acidity of the *prima via*, it proves very serviceable. As an internal and external remedy to obviate the sequelæ of the bile of rabid animals, venomous insects and reptiles, its power is well known. By way of inhalation, it is administered when it is desired to make a strong impression on the nervous system, in cephalalgia, hemicrania, and faintness or collapse. Ammoniacal inhalations have been found very useful in asphyxia, and to prevent an attack of epilepsy. The *aromatic spirits* has the preference as an internal medicine.

Ammonia, Valerianate of, Crystals.—Nervine stimulant, and antispasmodic. Particularly valuable in neuralgia. The favorable report of its efficacy in this disorder, made by M. Déclat, has been confirmed by practitioners from all quarters. It has proved signally potent in some severe cases, which had resisted all the ordinary remedies. Much benefit has been derived from it in some cases of hysteria, chorea, epilepsy and other nervous affections. See Jour. Materia Medica, vol. 4. Dose, two to eight grains dissolved in water.

Ammonium, Bromide of.—Dr. Gibb recommends it as an absorbent in glandular and other enlargements, in nervous affections connected with diseased

and irritated mucous membrane, epilepsy, chorea, whooping cough, &c. See Jour. Materia Medica, vol. 6. Dose, two to ten grains three times a day.

Arsenic, Iodide of.—Alterative and tonic. When given internally it is absorbed into the system, and is eliminated by the urine, saliva and perspiration. It is a powerful remedy, and requires to be given with great caution. Valuable in cancerous affections, lupus, lepra, psoriasis, impetigo, tinea capitis, &c. See Journal Materia Medica, vol. 3 and 6. Dose, one sixteenth to one-eighth of a grain three times a day.

Arsenic and Mercury, Solution Iodide of.—*Donovan's Solution.*—Each fluid dram contains Teriodide of Arsenic, equal to one eighth grain of Arsenious Acid, of Iodide of Mercury equivalent to one-fourth grain of the Peroxide of Mercury, and three fourth grain of Iodine, converted into hydriodic Acid.

Powerful alterative, particularly adapted to the treatment of venereal diseases, cancerous diseases, obstinate cutaneous diseases, sycosis, urticaria or nettle rash, &c.

Dose, five to twenty drops three times a day; preferable in distilled water.

Arsenite Potassa, Solution of.—*Fowler's Solution.*—Used in inveterate cutaneous affections, chorea, &c.

Each fluid dram contains one-half grain of Arsenious Acid. Dose, for an adult, five drops three times a day.

Bismuth, Citrate of.—This salt is perfectly soluble in water, by the addition of a small quantity of aqua ammonia; its ready solubility in the stomach renders it more desirable for administration than the sub-nitrate, or perhaps the other salts.

Dose, two grains, in substance, dissolved in water or syrup, by the addition of a few drops of aqua ammonia.

Bismuth Liquor, or Liquid Bismuth.—The advantages of this preparation are, that the metal is in a perfect state of solution, being a solution of ammoniated citrate, it mixes with water and other fluids without precipitation. "It allays pain in acute irritability of the stomach, (without nausea or much acidity), especially that which remains after ulceration, and is the most eligible form for the administration of Bismuth." Each fluid drachm contains two grains Citrate Bismuth.

Bismuth, Sub Carbonate of.—Recommended by Prof. Hannon of Brussels, as a substitute for the nitrate, who alleges for it the good qualities of the sub-nitrate, that it is antacid, readily soluble in the gastric juice, rarely constipates, and may be employed for a long time without oppressing the stomach; it is insipid, excites no repugnance, and may be taken before meals. Dose, ten to fifteen grains three times a day.

Bismuth, Sub Nitrate of.—Bismuth subnitrate, is tonic and anti-spasmodic, sedative and alterative, with special efficacy in atonic dyspepsia, painful affections of the stomach, as gastralgia, cardialgia and pyrosis, also in diarrhœa of typhus fever and consumption, in sub-acute and chronic dysentery. See Jour. Materia Medica, vol. 6. Dose, five to fifteen grains three times a day.

Bismuth, Tannate of.—This preparation combines the astringency of Tannin, with the sedative and other qualities of Bismuth. Was first introduced by Dr. Cap, of the Academy of Medicine, Paris, in diarrhea, chronic and acute dyspepsia, chronic gastritis. In these difficulties its virtue is due to its soothing influence upon the inflamed or irritated mucous surface. See Jour. Materia Medica, vols. 2 and 6. Dose, five to fifteen grains three times a day.

Bismuth, Valerianate of.—Sedative, astringent and anti-spasmodic; valuable

in neuralgic affections, painful affections of the stomach, chronic gastralgia, in gastrodynia of hysterical women, and particularly when combined with Belladonna. Dose, one-half to two grains.

Black Drop.—Synonymous with *Vinegar of Opium* and *Opii Acetum.* It is of double the strength of laudanum, six and a half minims containing the soluble parts of about one grain of opium. It exhibits all the anodyne or soporific properties of the narcotic, and may be advantageously used, in many instances, when in consequence of some idiosyncrasy in the disease or in the constitution of the patient, opium itself or laudanum is contraindicated, because they occasion headache, nausea and other disagreeable sequelæ. Dose, one to ten drops.

Calcium, Iodide of.—Alterative. This salt is very valuable in cases in which the iodide of potassium is inadmissible. It does not occasion idiosm or resorption of healthy tissues; it does not excite the circulation nor irritate the stomach and bladder by passing off to rapidly by the kidneys.

Its solution in milk is perfectly tasteless. It is particularly useful in squamous diseases of the skin, and chron and metallic poisoning by mercury, lead and copper. Dose,—One-fourth of a grain solution, three times a day.

Cantharidal Acetic Rubefacient.—A convenient and efficient instrument to produce counter-irritation, when it is desired to occasion merely redness or inflammation of the skin. Offered as a substitute for the ordinary irritants, such as mustard.

Cantharidal Acetic Vesicant.—An energetic and reliable epispastic and adapted to cover uneven surfaces. On account of the facility of application, certainty of effect, and slightness of pain, no agent is equal to cantharides for causing vesication when applied to the skin. Applicable to those conditions when it is desirable to substitute a mild and easily managed disease for an internal and intractable one; when a desiderative influence is required, and the absorbents, the circulation and the whole system need stimulation and increased vigor by external means. Recommended to physicians as the most prompt blistering article in use.

Cantharidal Collodion.—"It produces a blister in about the same time as the ordinary cerate, and has the advantages that it is applied with greater facility, is better adapted to cover uneven surfaces, and retains its place with more certainty." On application, evaporation of the ether takes place in less than a minute, and it may then be re-applied if necessary.

Carbolate of Lime.—Used for disinfecting purposes. Put up in five to ten pound boxes.

Cerium, Oxalate of.—Nervine-tonic and sedative. Prof. Simpson, of Edinburgh, speaks of it as almost a specific in chorea. It has been extravagantly lauded in chronic vomiting, and in that attendant on phthisis, hysteria, pyrosis, and atonic dyspepsia; while in the vomiting of pregnancy it has been found more successful than any other remedy. Singularly beneficial results have followed the employment of this agent in cases of general intestinal eruption, in irritable dyspepsia with gastrodynia, &c. Dose, one grain, two or three times daily, dissolved in water.

Chloroform, Chemically Pure.—This article is prepared by ourselves from alcohol and other pure materials, and is not the *commercial article* purified. It is adapted to inhalation and internal use.

Collodion, Surgical.—Useful in wounds to keep the edges together. It forms also, a coating, and has been applied in abrasions and burns. In operative

surgery it has been employed with remarkable success to hasten the process of healing by the first intention. It is open to none of the objections that are occasionally urged against the "cantharidal."

Elixir Calisaya.—The active agent for this elegant aromatic preparation is the most valuable species of the Cinchonas called Calisaya. It is an agreeable and general tonic in convalescence from disease in children and feeble persons, and prophylactic against intermittents. It will be found to be of great advantage in dyspepsia, attended with irritation of the stomach; in severe diarrhœas and those that have been chronic; in long continued inflammations of the mucous membranes, better treated with tonics than anti-phlogistically, and generally in weak and prostrated states of the system, particularly during the summer month.

Each fluid ounce contains forty grains of true Calisaya bark.

Elixir Calisaya and Iron.—This is one of the most elegant and acceptable preparations ever made. It combines all the virtues of the Calisaya bark with the important medicines, Iron and Phosphorus, in the form of the pyro-phosphate of Iron, a very mild, nearly tasteless salt, acceptable to the most delicate stomach; easily assimilated and not decomposed in the stomach by food or gastric juice.

Each fluid ounce contains thirty grains Calisaya, and twelve grains of Iron.

Elixir Calisaya Iron and Bismuth.—This preparation combines all the valuable properties of Calisaya and Iron, with those of the Ammonio Citrate of Bismuth, and has been used with marked effect in dyspepsia, anæmia, female debility, as a general tonic; a variety of cases will be readily suggested to the physician by the combination, in which it can be used with benefit.

Each fluid ounce contains, Calisaya forty grains; Iron, eight grains; Citrate Bismuth, eight grains.

Elixir Calisaya, Iron and Strychnia.—The combination of Strychnia with the valuable properties of the other articles, possesses the advantage of a larger adaptation to those cases of general debility complicated with nervous difficulties, as well as in cases attended with constipation, &c.

Each fluid dram contains one one-hundredth of a grain of strychnia.

Elixir Gentian and Chloride of Iron.—Agreeable tonic, hæmatinic, and alterative. By this combination, we have a remedy of great utility in atonic dyspepsia, in diseases accompanied by debility, in scrofula, in passive hemorrhages from the uterus, kidneys and bladder, in old cases of gleet, gonorrhœa, leucorrhœa, when the discharges have prostrated the system. It has been found beneficial in erysipelas, scarlatina, diphtheria, and in purulent infection of the blood. In these cases it is supposed to act by way of improving the condition of the blood. Each fluid dram contains three grains sesqui-chloride of iron and three and one half grains of gentian. Dose, one dram.

Elixir Iodide of Calcium and Protoxide Iron.—The *Chicago Medical Journal* writes:—"A very excellent alterative and tonic is afforded in TILDEN'S beautiful *elixir of iodide of calcium and protoxide iron.* We have always, previously, been disappointed in securing desired results from the use of the "*iodide of lime,*" but find this particular preparation to "fill the bill" to our very great satisfaction."

Dose, one teaspoonful three times a day.

Elixir Pepsine, Strychnia and Bismuth.—Highly lauded as a digestive. Particularly adapted to dyspepsia, the debility of the stomach following chronic gastritis, and in that attendant on convalescence and certain exhausting diseases such as phthisis. In these states, the gastric juice is not secreted in sufficient quantity to enable the stomach to perform its proper function. Pepsine is hime l

to contravene this departure from health by keeping up artificial digestion, while strychnia gives tone and integrity to the sympathetic, in which is acknowledged to reside the "secretive co ordination," thereby tending to effect a permanent cure, and bismuth operates as a sedative and alterative, and plays an important part in irritableness of the stomach, and in inflamed conditions of the gastro-enteric mucous membranes. Each fluid dram contains five grains of pepsine, $\frac{1}{16}$ grain of strychnia and one grain ammonio-citrate of bismuth. Dose, one dram before meals.

Elixir Phosphate of Iron and Quinia.—Valuable chalybeate and tonic. Convenient form in which to administer phosphorus, iron and quinia. Recommended in atonic states of the system generally, mollities ossium, &c. The properties and therapeutical utility of these elements are too well-known to require enumeration of the particular indications this combination is capable of fulfilling. Dose, one to two drams.

Elixir Phosphate of Lime.—Alterative, and an excellent antacid. Phosphate of lime in this form is readily taken by children, and is the pleasantest remedy that can be administered to meet a number of disorders. Admirably adapted to diarrhœa accompanied with acidity, to acidity of the stomach attending dyspepsia and gout, when a laxative influence is to be avoided. Beneficial in scrofula, scrofulous affections and rachitis.

Elixir Protoxide of Iron.—The general operation of the preparations of iron is as a tonic; they elevate the pulse, heighten the complexion, and promote the secretions, and are most useful when there is debility, relaxation and languid circulation. This preparation supplies to the blood and capillaries the coloring matter necessary to give what is termed good red blood. It is prescribed for chlorotic anæmia, scrofula, chorea, atonic dyspepsia, &c. It is reliable, pleasant, and very free from any disagreeable taste. Each fluid dram contains five grains of Iron.

Dose, one dram.

Elixir Protoxide of Iron and Quinia.—This preparation combines all the tonic properties of the iron, with the tonic and anti-periodic properties of Quinine, and is admirably adapted for children and delicate females, and is adapted to most cases where Iron would be used. Each fluid dram contains one-fourth grain of quinia and five grains of Iron. Dose, one dram.

Elixir Pyrophosphate of Iron.—This preparation of Iron possesses marked advantages over other preparations of Iron, its tastelessness and elegant appearance is an important feature in the cases of children, and many persons of a nervous delicate organization, particularly females who can not take the ordinary preparations of Iron; with some they disorder the stomach, and not only fail to be assimilated, but by preventing the gastric and intestinal secretions interfere with the digestion. A marked peculiarity in the Pyrophosphate is that it will scarcely ever in any case disagree, and patients receive great benefit from its use. The pyrophosphoric acid adds new virtues to the Iron, and bestows on this preparation advantages possessed by none other. Each fluid ounce contains sixteen grains of the Iron. Dose, one to two drams.

Elixir Pyrophosphate of Iron and Soda.—Chalybeate and alterative. A marked peculiarity of the pyrophosphate is that it will scarcely ever in any case disagree. The tasteless and elegant appearance of this medicine eminently adapt it to cases of children and those of a nervous delicate organization, when the combined influence of iron, phosphorus, and sodium are indicated. Each fluid ounce contains ten grains of pyro-phosphate of iron; fifteen grains pyrophosphate of soda. Dose, one to two drams.

Elixir Rhubarb and Magnesia.—Grateful form in which to administer an aperient and purgative. This preparation holds the active principles of rhubarb and magnesia in a soluble state, and is presented to the profession as an excellent and pleasant remedial cordial for the ordinary derangements of the gastro-enteric duct. Particularly applicable to children and adults of a delicate constitution. Dose, one to three teaspoonfuls for adults.

Elixir Valerianate of Ammonia.—Extensively, used in epilepsy also in neuralgia and nervous diseases, as hysteria, chorea, &c. Another agreeable form of administration is in the form of pills coated so as to conceal all disagreeable odor. Dose, one-half to one dram.

Elixir Valerianate of Ammonia and Quinia.—This preparation contains the nervine, stimulant and anti-spasmodic properties of the former, with the anti-periodic properties of the latter, and is especially useful in intermittent neuralgia, as well as other forms of the same disease and nervous affection.

Each fluid dram contains two grains Valerianate Ammonia and one-fourth grain Valerianate of Quinia. Dose, one-half to one dram.

Elixir Valerianate of Ammonia and Strychnia.—Neurotic-tonic and stimulant. An elegant combination, pleasant to the eye and taste. A medicine which the profession has received with much favor in the management of nervous disorders generally. See Jour. Materia Medica, vol. 8. Each fluid dram contains two grains valerianate of ammonia, and $\frac{1}{16}$ grain of valerianate of strychnia. Dose, one-half to one dram.

Elixir Valerianate of Strychnia.—Nervine stimulant and anti-spasmodic. Exerts a powerful stimulating influence on the nervous system and spinal cord. The therapeutics of the articles are too well known to need particular description. Each fluid dram contains one-sixteenth grain valerianate of strychnia. Dose, one-half to one dram.

Ether Chloric, Concentrated, Chemically Pure.—A mixture of equal parts by weight of chemically pure chloroform and pure deodorized alcohol. The alcohol acts as a corrigent against depressing effects.

Ether, Spirits Nitre, Chemically Pure.—This article is chemically pure, and should be carefully secluded from the light and air. Possesses diuretic, diaphoretic and antispasmodic virtues. Much esteemed as a medicine in febrile affections, and extensively employed either alone or in conjunction with other agents for the purpose of promoting the secretions, especially those of the skin and kidneys.

Ether, Sulphuric, Chemically Pure.—We prepare only that which is chemically pure and concentrated. It has been used by many surgeons as an anæsthetic, and by them pronounced to be *entirely pure.*

Fluid Opium Deodorized.—*Fluid Opii. Deod.* (*U. S. P.*)—The great variety of indications fulfilled by the use of opium, and its extensive applicability to the cure of disease, have incorporated it into almost every practice of medicine. This preparation is superior to the Elixir that has had so wide a reputation, possesses all the anodyne, sedative and anti-spasmodic effects of opium. The ill effects of opium are owing to the presence of certain deleterious principles contained in it which, when extracted, do not detract from its highly medicinal qualities. It is a pure aqueous preparation, has none of the odor of opium offensive to some, retains all that is useful, and affords all the benefits intended to be derived from its use.

It is a very pleasant anodyne and anti-spasmodic, much used to allay cough in

chronic catarrh, asthma, &c.; to relieve nausea and slight pains in the stomach and bowels; to check diarrhea; and in infantile cases to procure sleep.

Many physicians have long used an empiric aqueous solution, and differing only from the officinal solution, in mode of preparation; the strength of the opium should be accurately ascertained before preparing the infusion, otherwise it can not be relied upon, as opium is very often obtained largely adulterated.

Repose is usually induced by the minimum dose, but in obstinate irritation, the dose can be repeated several times with safety.

The advantages claimed for this preparation are, that constipation and unpleasant consequences following the administration of opium in its ordinary forms are wholly or nearly avoided.

This preparation may be administered as anodyne or to induce rest, when opium itself can not be prescribed with safety. Dose, for an infant, one to five drops; for an adult, fifteen to sixty drops.

Glycerine. White.—This article is deodorized, colorless, and equal in elegance and purity to any similar article in market.

Glycerole Hypophosphites.—A combination of the glycerine with the hypophosphites. Peculiarly applicable to pulmonary degeneration and anæmic conditions of children.

Gutta Percha Solution.—Beneficial as a protective covering for compound fractures, open cancers, suppurating gangrenous surfaces, burns, abrasions, wounds, &c. May be applied with a brush or by pouring. A delicate film is left by evaporation of the liquid, which completely excludes the air and acts as an artificial cuticle. Has been topically employed with advantage in various cutaneous affections, scrofulous and indolent ulcers, and as an ectrotic in smallpox.

Gutta Percha Vesicant.—The most acceptable, certain and painless vesicant in use. Can be applied with facility, is adapted to cover uneven surfaces, and retains its place and form without spreading.

Hoffman's Anodyne, or Compound Spirits of Ether.—This article is strictly officinal. Contains the officinal proportion of etherial oil. The commercial article coutains a variable proportion of etherial oil. Highly serviceable in nervous irritation and want of sleep from this cause; possessing the stimulating and anti-spasmodic properties of ether together with potent anodyne virtues Dose, one-half to one fluid drachm in sweetened water.

Hypophosphites.—*Lime, Soda, Potassa, Iron, Manganese, Ammonia.*—Recommended for the treatment of phthisis, in some types of mental aberrance, and nervous debility, and defective osseous formation. Dose, ten to twenty grains each.

Iodide of Lime.—This preparation is in the form of yellow crystals, is chemically pure, and perfectly soluble. "Iodide of Lime" says Dr. Talson, "was first introduced in 1855. It has been rapidly gaining favor among practitioners as a remedy of great value. It is used in those cases where Iodide of Potassium is indicated, but with more marked effects than usually attend the use of that salt. The lime and iodine are held together by a feeble affinity, and the salt will not admit of exposure without evolving free iodine. Each dram of the salt contains eight and one half grains of Iodine, and each fluid ounce of the solution contains one-third grain of Iodine. The Iodine in the solution exists in the form of Iodide of Calcium and Iodide of Lime. Acids decompose the solution, and free the Iodine, and hence the utility of this form for the administration of Iodine. Probably in the

state of an oxide, the Iodide of Calcium is superior to the Iodide of Potassium in several particulars:

"1. The smallness of the dose, and the minute state of its atomic divisions. 2. Not passing off so quickly through the kidneys. 3. Its ready combination with the blood and tissues, manifested by its alterative effects. 4. In being nearly tasteless, and therefore readily taken by children. 5. It is less expensive. 6. In not producing either gastro-enteric or vesical irritation.

"It has been used with much success in throat diseases, in morbid conditions of the general system, in scrofulous affections, intractable cases of neuralgia, diseases caused by metallic poisons, &c. The dose of the salt is very small—about one-fourth of a grain given in solution, two or three times a day. Of the solution, two to four fluid drams may be given as often.

Iodide of Lime, Syrup of.—For the convenience of administration, Syrup Iodide of Lime is recommended; it is pleasant and readily administered to children. One of its first effects is to increase the appetite, exhibiting tonic properties. Children of scrofulous diathesis rapidly improve under its aid, and it is also particularly adapted to a large number of chronic or acute affections peculiar to them. It posseses decided alterative powers, and when alterative remedies are indicated, it can be used without hesitation. Each fluid ounce contains the equivalent of three and one-half grains of iodine.

Iodide of Sodium.—Alterative. Has similar therapeutical effects and utility with the iodide of potassium, but more tolerable than the latter iodide. In constitutional syphilis it has produced remarkable cures. Dose, twenty grains, gradually increased to forty, dissolved in three fluid ounces of water.

Iodide of Sulphur.—Alterative. Properly diluted, and associated with other agents it has proved serviceable in obstinate and chronic scrofulous diseases. Applied in the form of ointment in the various skin diseases, such as tinea capitis, lupus, lepra, &c.

Iodoform.—Volatile, soft to the touch, insoluble in water, soluble in alcohol, and in ether, and has a very large proportion of iodine. Being non-irritant and of an organic nature, it is more *readily absorbed and assimilated* than the iodine or iodides. Possesses all the virtues of iodine, together with sedative properties. Been employed in goitre, rachitis, glandular tumors, syphilis, cutaneous eruptions, neuralgic affections, &c. Dose, one to three grains.

Iron, Ammonio-Citrate of.—Possesses an agreeable odor and taste, is aromatic, carminative and tonic. Used in debility after exhausting diseases, in anæmic states of children, in scrofulous affections, and in dyspepsia in scrofulous subjects. Dose, five grains.

Iron, Ammonio-Tartrate of—Scales.—This substance has a sweetish and not unpleasant taste, and is soluble in water. Highly recommended as a mild unirritating chalybeate. Dose, ten to thirty grains.

Iron and Potassa, Tartrate of.—Grateful chalybeate and alterative. Excellent ferruginous preparation for children. Dose, five to ten grains.

Iron by Hydrogen (Quevenne's).—According to Quevenne, it introduces more iron into the gastric juice than any other chalybeate. Chiefly employed in anæmia, chlorosis, amenorrhœa and chorea. Dose, three to six grains.

Iron and Manganese, Citrate of.—Blood-restorative, tonic and anti-anæmia. Applicable to that class of diseases where a depurator to the blood and

powerful tonic are needed. Manganese promotes the promptness of action and the hæmatinic influence of the iron element. Dose, five to ten grains.

Iron and Quinia, Citrate of.—Blood-restorative, tonic and anti periodic. Peculiarly fitted for children and delicate females. Easily borne when the stronger salts of iron are inadmissible. Dose, five grains

Iron, Quinia and Strychnia, Citrate of.—Blood-restorative, tonic and nervine stimulant. Recommended in atonic dyspepsia, some types of paralysis, chorea, amenorrhœa, and incontinence of fæces and urine.

Iron and Strychnia, Citrate of.—One part of Strychnia to forty-nine of Citrate of Iron. Used in atonic dyspepsia, chorea, paralysis, amenorrhœa, &c. Dose, three to six grains.

Iron, Hydrocyanate of.—Valuable in epilepsy; has proved beneficial when other remedies failed. See Dr. McGugin's article, Jour. Materia Medica.

Iron Hydrated, Sesquioxide of.—One of the best antidotes we possess for poisoning by arsenic. Dose, tablespoonful every fifteen minutes or oftener.

Iron, Iodide of.—Its properties are those of a tonic, emmenagogue, and absorbent. As a tonic it promotes the appetite, re-establishes digestion, and improves the general health. This preparation is recommended as particularly well adapted for constitutions of a scrofulous diathesis. It is employed with much success in chlorosis, atonic amenorrhœa, leucorrhœa; diabetes and obstinate syphilitic ulcers. Ricord regards it as a valuable remedy in secondary syphilis, especially when occurring in debilitated subjects. Dose, one grain gradually increased to eight grains.

Iron, Lactate of.—The Lactate of Iron produces a marked effect in increasing the aptite, has the general therapeutical properties of the ferruginous preparations. It has been successfully prescribed for anæmic and chlorotic patients, and is regarded as a potent and valuable agent in amenorrhœa and dysmenorrhœa.

Dose, ten to twenty grains.

Iron, Muriate, Tincture of.—Diuretic, astringent and hæmatinic. It is one of the most powerful of the ferruginous preparations, and may be administered with advantage whenever iron is indicated. It is valuable as tonic in scrofula; is said to exercise a peculiar influence on the urinary passages, and has been successfully employed in gleet, obstinate gonorrhea and leucorrhea. Employed with favorable results in incontinence of urine of children, in spasmodic stricture of the urethra, in atonic hemorrhage from the bladder, uterus and kidneys. Dr. O. Rees deems this the most desirable form of iron for internal use in hæmaturia, while Dr. G. Bird no less highly speaks of its potency in chlorosis. This tincture is advised in *albuminuria* and chylous urine. Dose, ten to thirty drops diluted in water.

Iron, Nitrate of.—Tonic, sedative and astringent. Extravagantly praised as a remedy in chronic diarrhœa unattended by inflammation, especially when occurring in delicate and nervous women. Useful in menorrhagia, and in leuchorrhœa, particularly of exsanguine, chlorotic and feeble subjects. Dose, five to eight drops, properly diluted.

Iron, Per-Sulphate of.—Monsel's solution. It is very efficacious as a styptic, and by its power of congealing the blood, is well adapted to cases of hemorrhage from incised surfaces, and especially where it is desirable to avoid irritation.

It has been highly recommended as efficacious in arresting internal hemorrhages from stomach and bowels, and in subduing chancre. Dose, five to fifteen drops.

Iron, Proto-Carbonate of—Vallet's Mass.—Hæmatinic, tonic and emmenagogue. Freedom from astringency, unchangeableness and ready solubility in acids, are its chief recommendations. It is the best chalybeate that can be employed to produce the alterative effects of iron. Dose, five to thirty grains daily, in divided quantities.

Iron, Protoxide, Solution of.—For combination with Elixir of bark.

Iron, Citro-Ammoniacal, Pyro-Phosphate of.—The preparation of this article is based upon the method of M. G. Robiquet.

While it is a mild and agreeable chalybeate, its action on the system is efficient, and it may be administered in any form that may be desirable, that of pill, solution in water, syrup or elixir. It is very favorably spoken of in the treatment of rickets and diabetes, and has been employed with marked success in anæmic diseases; has the advantage of ready assimilation in the system, and of entire absence of any tendency to disorder the stomach or bowels. Dose, two to three grains.

Iron, Sesqui-Chloride of.—In the form of crystals. The most powerful of the ferruginous preparations. Is deliquescent, and very soluble in water, alcohol and ether. May be used for the ordinary purpose of chalybeates.

Iron, Sesqui-Chloride of, Solution (Strong).—Principally used as a styptic in the cure of varices, in hemorrhages from superficial wounds, as an injection in ordinary aneurisms, and a caustic to warts.

Iron, Tannate of.—Astringent and tonic. Useful in chlorosis, and to check exhausting discharges. A popular application to ringworm. Dose, five to eight grains daily in divided quantities.

Iron, Valerianate of.—Blood-restorative and nervine-sedative. Especially valuable in hysterical affections complicated with chlorosis. Soluble in alcohol. Dose, one to two grains several times daily.

Lead, Acetate of.—Astringent and sedative. Diminishes the secretions and reduces the action of the capillary system. Most frequently used in hemorrhages, particularly from the lungs, stomach, intestines and uterus. Dose, one to five grains.

Lithia, Bromide of.

Lithia, Carbonate of.—This substance has come into use as a solvent for uric acid calculi. Its great solvent power for that acid also renders it of much service in gout and rheumatism. Suggested as an injection into the bladder in cases of lithuria and oxaluria. Dose, three to eight grains several times daily.

Lithia, Iodide of.

Magnesia Citrate, Granular Effervescent.—The effervescent properties of this elegant preparation are retained in granular form, preserving the flavor as a palatable saline draught.

Mercury, Bi-Iodide.—Dose, one-sixteenth to one-fourth grain.

" **Proto-Iodide.**—Dose, one-eighth to one-fourth grain.

Pepsine, Pure.—This substance is ragarded as a positive anatomical ingredient of the gastric juice, both essential to its constitution and physiological action. Introduced into the system it increases the appetite, allays irritability of the stomach, and promotes changes in this viscus essential to healthy digestion of the nitrogenous elements of food. See Jour. Materia Medica, vol. 5 and 6. Dose, ten to fifteen grains before meals.

Pepsine, Wine.—This elegant cordial contains the digestive principle of the gastric juice held in solution by *pure sherry wine*, and is acceptable to even those of the most delicate organizations. No more grateful and efficient medicine has been

tried in dyspepsia and kindred diseases. One-half a wine glassful should be taken just before or immediately after meals.

Potassa, Acetate of.—Efficient and mild diuretic and alterative. A medicine of superior efficacy. Employed in dropsies with good success, and in several skin diseases, such as psoriasis, eczema, and lepra. It has produced remarkable cures. No nicety need be observed in the dose.

Potassa, Chlorate of.—(*Chemically Pure.*)—"It has been efficaciously employed in scorbutus, hepatic affections, aphthous ulcerations of the mouth, cancrum oris mercurial salivation, abscesses, boils, eruptions, ulcers, purpura hemorrhagica, etc." Many physicians mainly rely on it as a drink in scarlatina.

Potassium, Bromide of.—Alterative, antaphrodisiac, deobstruent and sedative to the nervous system. The highest authorities call attention to its value in epilepsy. It has produced the happiest effects in many hysterical cases, attended with a great deal of sexual excitement and various distressing symptoms. In sleeplessness and in "low spirits," after a failure of opium, valerian and other antispasmodics and sedatives, it has proved the desideratum. Useful in scrofula, enlargement of spleen, liver, &c. Dose, three to ten grains, three times daily.

Potassium, Arseniated Bromide of.—The therapeutics of this preparation have received considerable attention and laudation Dr Chas. A. Lee says: "I am satisfied it is a most valuable preparation." Dr. L. Elsberg, of New York, in a communication to the *Medical and Surgical Reporter*, Philadelphia, (Sept. 24, 1859), spoke of it as possessing "*tonic, alterative and resolvent* properties." E. H. Sholl, M. D., in the same journal, has recently endorsed Dr. E.'s opinion, and from actual experience, proclaims himself satisfied "with the rapidity and certainty of its excellent tonic effects," remarking:

"It presents to the profession a remedy concentrated and palatable, objects not be disregarded, when contending, as we frequently have to do, in the peculiar class of cases to which it adapts itself, with stomachs easily revolted by the grosser and bulkier medicines." Dr. S. has used it in chronic intermittents, and this class of diseases, and says: "It has succeeded admirably, relieving them more speedily and certainly than barks, ferruginous tonics, arsenic or strychnia." He recommends it in secondary syphilis, occurring in persons of a scrofulous nature; advises it in combination with stillingia, in chlorosis; with sanguinaria, in "long-standing cases of neuralgia;" and with ergot in *climacteric menorrhagia*. More authority could be adduced. Dose, three to four drops in a wine glass of water, twice daily.

Potassium, Chloride of.—Anti-neuropathic and an alterative purifier of the blood and humors. Used for nearly the same purpose as the chlorate of potassa. but possesses more causticity.

Potassium, Iodide of.—Of all the preparations of iodine, this one is preferred by practitioners generally, for producing the constitutional effects of iodine Recommended in the treatment of erysipelas, also as an antidote in chronic poisoning by lead, mercury, and other metals. See Jour. Materia Medica, vol. 5 and 6. Dose, two to ten grains, properly diluted three times daily.

Quinia, Chlorate of.—This article was introduced into medicine within the past year, by Dr. Lyons, of Dublin, who claims for it a febrifuge of surpassing potency, The results of his experience with this agent would place it foremost in the rank of agents to combat the graver forms of typhus, typhoid, pneumonia, scarlatina, small pox, low phlegmonous inflammation, and low pyrexial states. When the heart is

feeble it is said to possess an almost magical efficacy in reducing yet sustaining the pulsations.

The *Medical Press and Circular*, (Dec. 19, 1866, page 618), says: "Further experience of this valuable agent has confirmed the views entertained by its inventor." See Jour. Materia Medica, vol. 6. Dose, three to five grains, dissolved by the aid of a like number of drops of the perchloric acid.

Quinia, Hypophosphite of.—Febrifuge. The advantages claimed for this combination are, that the utility of quinine is increased. The range of diseases widened, in which its use is indicated. The properties of this preparation render it applicable to fever and asthenic conditions generally. See Jour. Materia Medica vol. 1.

Quinia, Tannate of.—Used in nocturnal sweats. See M. Delioux' article, Jour. Materia Medica, vol. 2.

Quinia, Valerianate of.—Particularly useful in intermittent neuralgia; said to produce less disorder upon the nervous system than the sulphate.

Dose, one grain.

Santonin.—Invaluable as a vermifuge. An aperient should follow its administration. Dose, two to five grains.

Salicin.—Tonic and anti-periodic. Its medical properties very much resemble those of quinine. Dose, five to ten grains.

Silver, Nitrate of.—Crystals, and chemically pure.

Spirits of Lavender.—An agreeable perfume, and enters as an ingredient into a variety of preparations.

Spirits of Lavender, Compound.—Delightful aromatic compound. Much employed as an adjuvant and corrigent of other medicines; and as a remedy for gastric uneasiness, nausea, flatulence, and languor or faintness. Dose, thirty to sixty drops.

Styptic Colloid.—Styptic and adhesive. The tincture of the muriate of iron constitutes the base of this styptic. A very efficient local application to arrest hemorrhage from leech bites, wounds and surgical operations, &c. Applicable to venereal warts, spongy granulations, ulcers attended with profuse discharge, fungous sores, compound fractures, burns, and suppurating surfaces.

Styptic Colloid.—Tannin forms the base. Uses obvious.

Styptic Colloid, with Carbolic Acid.—Styptic, adhesive, and antiseptic. Its influence on the blood, serum, pus, and all fetid discharges is to solidify and deodorize. It modifies suppuration, and facilitates cicatrization. Numerous observations of gangrenous wounds, diffuse phlegmon and of necrosis are reported, which readily improved under the action of this solution. It forms a beneficial protectorate to sores and abrasions; an efficient styptic in cases of external hemorrhages, and a valuable anti-septic in ill-conditioned ulcers, sloughing wounds, carbuncles and cancerous ulcerations.

Styptic Colloid, with Creasote.—An excellent unirritating styptic and deodorizer. This valuable topical preparation possesses the styptic properties of tannin with the anti-septic qualities of creosote.

Syrup Blackberry, Compound Aromatic.—This is prepared from the formulæ of Surgeon Gen'l. U. S. A., and was found very efficacious in chronic diarrhea prevalent in the army; it is also an excellent substitute for the spiced syrup of Rhei where that remedy is deficient in astringency. Put up in four ounce and one pound bottles. See Jour. Materia Medica, vol. 2 and 6.

Syrup of Citrate of Iron.—A mild chalybeate. Used for the ordinary purposes of ferruginous preparations. Each fluid dram contains citrate of iron five grains. Dose, one-half to one teaspoonful.

Syrup of Citrate of Iron and Strychnia.—Agreeable tonic, blood-restorative, and nervine-stimulant. This combination possesses the combined properties of iron and strychnia. It has been successfully employed in atonic cases of dyspepsia, constipation, and in some forms of paralysis, amennorrhœa, and chorea. Dose, one dram.

Syrup of Iron and Quinia, Citrate of.—A convenient form in which to administer iron and quinia. Especially adapted to children and delicate females.

Syrup of Hypohosphites.—(*Compound of Lime, Soda, Potassa and Iron.*)—Used in incipient phthisis, scrofulous ulcerations, &c. Its use is held to increase the nervous force and exert an important influence directly on the nervous system of a tonic character, and is unquestionably useful in that debilitated condition to which it is often difficult to give a name, and particularly in debility from prolonged lactation Dose, one teaspoonful three times a day.

Syrup of Hypophosphites of Iron.—Protoxide of iron forms the base, which possesses the advantages over any other salt of iron in being more permanent, more readily assimilated, and more soluble. Most cases requiring alterative tonics or hæmatinics, will respond favorably to its use. Dose, one dram containing one grain of hypophosphite of iron.

Syrup of Hypophosphite of Iron and Manganese.—This combination is devoid of the constipating tendency of some ferruginous preparations. Manganese, besides supplying the system with one of its elementary constituents, greatly enhances the tonic and hæmatinic influence of the iron, and the hypophosphite salts readily disengage the phosphorus. These virtues render it a superior medicine in an impoverished condition of the blood, and impairment of the nervous and vital energies. Each fluid dram contains two grains of the combined salts. Dose, one dram three times a day.

Syrup of Hypophosphites of Iron and Quinia.—A valuable medicine in many cases of debility. Acts promptly on the system as a stimulant, tonic, and regenerator of nervous force and integrity. Dose, one to two drams.

Syrup of Hypophosphites, Lime and Soda.—(*Churchill's*)—This preparation is recommended particularly in cases of pulmonary tuberculosis. Each fluid dram contains six grains of the combined salts. Dose, one to three drams.

Syrup of Iodide of Iron.—Tonic, emmenagogue, and deobstruent. Very valuable preparation, and particularly adapted to persons of a scrofulous diathesis. See Jour. Materia Medica, vol. 4. Dose, twenty to forty drops diluted with water.

Syrup of Iodide of Iron and Manganese.—Tonic and alterative. Eminently applicable to that class of diseases where a depurator of the blood, a powerful tonic and active alterative are indicated. Recommended in anæmia, cancer, syphilis, scrofula, and many diseases of the skin, and glandular enlargements. Dose, ten to thirty drops.

Syrup of Iodide of Starch.—Produces the eutrophic effects of iodine without the occurrence of that gastric irritation and the other unpleasant symptoms which occasionally attend the exhibition of iodine in a free state. Each fluid ounce contains iodine one and a half grains. Dose, teaspoonful three times daily.

Syrup of Phosphates.—(*Compound of Lime, Soda, Potash and Iron.*—

Chemical food). The value of this article as a nutritive tonic is too well known to need any extended notice.

Syrup Phosphate of Iron, Quinia and Strychnia.—Highly esteemed as a chalybeate, tonic and nervine stimulant. Uses of this combination will readily be suggested. Each fluid ounce contains phosphate of iron, one grain, phosphate of quinia, one grain, phosphate of strychnia, $\frac{1}{32}$ grain. Dose, one to two drams.

Syrup of Protoxide of Iron with Iodide Potass.—In this preparation are combined a mild but efficacious chalybeate and valuable alterative. In cases of goitre, strumous enlargement of the glands, strumous ophthalamia, leucorrhea, mercurial cachexy, and all tubercular affections, &c., this compound proves eminently serviceable, enriching the blood, improving the digestion and invigorating the system generally. It may be employed in all atonic conditions, where the iodide of potassa is indicated. Dose, one half to one dram.

Syrup Protoxide Iron and Quinia.—Efficient as a tonic, anti-spasmodic and febrifuge. In febrile relapses, acute rheumatism, dyspepsia, general debility, convalescence from acute and chronic diseases, and every disease characterized by periodicity, it may be given with much confidence and assurance of success.

Dose, one to two drams.

Syrup of Protoxide of Iron, Rhei and Columbo.—A valuable remedy in indigestion. This syrup has been universally commended by all who have given it a fair trial and is pronounced a medicine superior to any other similar preparation. Each fluid ounce contains iron, sixteen grains, rhubarb and columbo, each five grains. Dose, one to two drams at meal times.

Syrup of Pyro-phosphate of Iron.—*For properties see Iron Pyrophosphate Citro Ammoniacal.* Dose, one dram.

Syrup of Super-phosphate of Iron.—Tonic and refrigerant. This combination is regarded as serviceable in hysteria, leucorrhea, and impotency from masturbation, &c. It may be used with benefit in diabetes, and to allay nervous excitement. Dose, one dram.

Zinc, Acetate.—Topical remedy in form of collyrium, in ophthalmia, and as an injection in gonorrhœa, gleet, &c. Dose, one to twenty grains.

Zinc, Chloride.—Used chiefly as an escharotic in cancerous affections, and to ulcers of an anomalous character; it appears not only to destroy the diseased structure, but to excite a new action on the surrounding parts.

Zinc, Iodide.—Tonic, astringent and anti-spasmodic. Used with success in chorea, scrofula, cachexia and some forms of hysteria. See Jour Materia Medica, vol. 6. Dose, one grain.

Zinc, Lactate.—Dr. Herpin introduced this preparation as a remedy in epilepsy. He considers it no less potent than the oxide, and possessing over it the preference, in that it is more easily taken, and less liable to disagree with the stomach. Dose, two to ten grains.

Zinc, Phosphate.—Tonic It may be administered in almost every case of debility supervening any disease, unattended with inflammation.

Dose, one to three grains.

Zinc, Tannate.—Highly useful in affections of the eyes accompanied by muco-purulent secretions. Thirty grains in six fluid ounces of water and one-half fluid ounce of mucilage is the solvent employed as a wash.

Zinc, Valerianate.—Anti-spasmodic; used in anomalous nervous affections attended with palpitations of the heart, constriction of the throat, and in nervous affections which accompany chlorosis. Dose, one-half to three grains.

WINE OF WILD CHERRY.

We present the Medical Profession a new preparation of this valuable indigenous remedy. That now offered is scientifically prepared, the process being the same as is employed in the preparation of our pure extracts. It is subject to no heat by which the hydrocyanic acid is decomposed, thus presenting the whole of the sedative properties and tonic virtues of the bark, with a portion of its tannic astringency held in solution by pure Sherry Wine.

Uniting with a tonic power the property of quieting irritation and diminishing nervous excitability, it is adapted to cases where the digestive powers are impaired with general local irritation existing at the same time. Its uses are indicated in all cases requiring the use of a general tonic, particularly in cases of the impairment of the constitution by dyspepsia, indigestion, &c., in dyspepsia attended with neuralgic symptoms, and general debility attending inflammatory fevers; and in diseases in which debility of the system is united with general local irritation.

On account of its gently astringent properties united with its sedative action, it has been found highly beneficial in complaints incident to the summer months, in diarrhœa chronic diarrhœa, and in preventing the weakness and relaxation of the bowels which produce them.

Dose—From a teaspoonful to half a wineglass, three times a day.

FERRATED WINE OF WILD CHERRY.

We present to the medical profession a new preparation of this valuable indigenous remedy. Wild Cherry in various forms has long been a favorite remedy with American practitioners, as well as in domestic use; as a tonic and stimulant on the digestive organs, and at the same time exercising a sedative influence on the circulations and nervous systems. From this combined action, it has been found very useful in a variety of diseases, or states of disease, when it is of importance to impart tonicity, and yet avoid any undue excitement of the heart and blood vessels, as during the first stages of convalescence from inflammatory attacks, and in many pulmonary diseases. To the acknowledged property that *Iron* possesses of enriching the blood, may be ascribed its efficacy in preventing the development of tubercular disease. It has long been desired to unite these important medical agents, which we have accomplished in this preparation for those cases of anæmic condition, where Cinchonas are inadmissible, as well as in cases of impaired health, with much nervous excitability.

In cases of general debility, which often succeeds inflammatory diseases, dyspepsia, scrofula, and in consumption it has been found very beneficial.

Dose—one to four drams, three times a day.

☞ TO PHYSICIANS! ☜

We constantly receive letters from Physicians complaining that they cannot always obtain such of our preparations as they desire to use, and often have others of an *inferior quality* substituted; to provide for such instances, if they will write us, we will give them the names of Druggists near them who keep a full assortment of our preparations

Ferrated Wine of Wild Cherry and Iodine.

Alterative, hæmatinic, tonic and arterial sedative, combining the valuable properties of Iodine, Pyrophosphate of Iron and Wild Cherry held in solution in pure Sherry Wine. In the management of diseases where it is desired to produce a salutary change in the disease, but without exciting any sensible evacuations or cardiac action, and at the same time to impart to the blood its hæmatin element, and to the digestive organs tone, to the nervous system integrity, and thereby to combat general atony, this new and elegant cordial is confidently recommended. Its reparative action on the system of nutrition, and its anti-anæmic influence render it applicable to a largely diversified class of diseases.

Each fluid ounce contains two grains of Iodine and twelve grains of Iron.

Dose, one teaspoonful three times daily.

Wine of Wild Cherry and Iodine.

Alterative, tonic, stomachic and arterial sedative, and operating as a general excitant of the vital action, especially of the absorbent and glandular systems. In the numerous cases of debility consequent on diseased glands or absorbents, particularly when there is cardiac complication, in glandular enlargements and morbid growth occurring in persons of a delicate constitution and of a scrofulous diathesis, in ovarian tumors, in enlargements and indurations of the liver, spleen, mamæ, testes and uterus, especially when symptoms of constitutional decline have set in, and in many types of hepatic affections. this new remedy appears to be pre-eminently indicated. If symptoms of iodism arise, the medicine should be discontinued, and milk diet prescribed.

Each fluid ounce contains two grains of Iodine.

Dose—One teaspoonful three times daily.

Wine of Wild Cherry and Iodide of Iron.

Alterative, hæmatinic tonic, and arterial sedative, combining the valuable properties of Iodine, Iron and Wild Cherry held in solution in pure Sherry Wine. In the management of diseases where it is desired to produce a salutary change in the disease, but without exciting any sensible evacuations or cardiac action, and at the same time to impart to the blood its hæmatin element, and to the digestive organs tone, and thereby to combat general atony, this new and elegant cordial is confidently recommended. Its reparative action on the system of nutrition and its anti-anæmic influence render it applicable to a largely diversified class of diseases.

Each fluid ounce contains eight grains of Iodide of Iron.

Dose—One teaspoonful three times daily.

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LIST OF

Fluid and Solid Extracts, Alkaloids, Resinoids, Pharmaceutic Sugar-coated Pills and Granules, with Synopsis of their Medical Properties.

Achillea Millefolium (*Yarrow*).—Mild, aromatic tonic, antispasmodic and astringent. Useful in intermittents, flatulent colic and nervous affections, and low forms of exanthematous fevers.
Fluid Extract—Dose: ½ to 1 dram.

Aconitum Napellus (*Aconite*).—A powerful narcotic. Used in rheumatism, neuralgia, epilepsy, paralysis, amaurosis, scrofula, syphilis, intermittent fever, dropsies, &c. Valuable as an antiphlogistic remedy, and in cases of active cerebral congestion or inflammation.
Fluid Extract—Dose: 2 to 8 drops.
Solid Extract—Dose: ½ to 1 grain.
Pills—½, ½ and 1 grain.

Aletris Farinosa (*Star Grass*).—One of the most intense bitters known. Used in infusion as a tonic and stomachic; large doses produce nausea and a tendency to vomit. Has been employed in chronic rheumatism and dropsy.
Fluid Extract—Dose: 10 to 30 drops.
Aletrin—Dose: 1 to 3 grains.

Alnus Rubra (*Tag Alder*).—Alterative, emetic and astringent. Useful in scrofula, secondary syphilis, and several forms of cutaneous diseases.
Fluid Extract—Dose: 1 to 2 drams.
Alnuin—Dose: 1 to 3 grains.

Angelica Atropurpurea (*Angelica Root*).—This plant is aromatic, stimulant, carminative and diuretic. It is employed in flatulent colic, heartburn, in diseases of the urinary organs and passive dropsy, and to promote menstruation.
Fluid Extract—Dose: ½ to 1 dram.

Anthemis Nobilis (*Chamomile*).—Tonic. Used in cases of enfeebled digestion, general debility, and languid appetite. In large doses will act as an emetic.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 4 to 20 grains.
Pills—2 grains.

Apocynum Androsæmifolium (*Bitter Root*).—Valuable in the treatment of chronic hepatic affections; used as an emetic and diaphoretic; as an alterative in syphilitic and scrofulous affections, as well as in intermittents and the low stage of typhoid fevers.
Fluid Extract—Dose: Tonic, 10 to 20 drops; Diaphoretic, 15 to 25 drops; Emetic, ½ to 1 dram.
Solid Extract—Dose: 2 to 8 grains.
Apocynin—Dose: ½ to 2 grains.
Pills—2 grains.

Apocynum Cannabinum (*Indian Hemp*).—Powerfully emetic; in decoction, diuretic and diaphoretic. It produces much nausea, diminishes the frequency of the pulse, and appears to produce drowsiness, independently of the exhaustion consequent upon vomiting. Of magical efficacy in dropsy.
Fluid Extract—Dose: Tonic, 5 to 15 drops; Emetic, 20 to 60 drops.
Solid Extract—Dose: 1 to 5 grains.
Pills—1 grain.

Aralia Hispida (*Dwarf Elder*).—Possesses sudorific, diuretic and alterative properties. It is recommended as serviceable in dropsy, gravel and suppression of urine.
Fluid Extract—Dose: 1 to 2 drams.

Aralia Racemosa (*Spikenard*).—Alterative and gently stimulant. Cutaneous, rheumatic, syphilitic and pulmonary affections have been successfully treated by this agent.
Fluid Extract—Dose: 1 to 3 drams.

Arctostaphylos Uva Ursi (*Uva Ursi*).—Uva Ursi is an astringent tonic, and has a specific direction to the urinary organs, for complaints of which it is chiefly used; has reputation as an antilithic in gravel, chronic nephritis, ulceration of the kidneys, bladder and urinary passages. It has been recommended in place of Ergot of Rye. It does not cause such powerful contractions, nor is its use attended with as much danger.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 5 to 15 grains.
Pills—2 grains.

Aristolochia Serpentaria (*Virginia Snake-root*).—A stimulant tonic, used in typhoid fever, whether idiopathic or symptomatic, when the system begins to feel the necessity for support, but is unable to bear active stimulation. Its action may be much improved by combination with Cinchona, particularly in intermittent fevers. Employed as a gargle in malignant sore throat.
Fluid Extract—Dose: ½ to ½ dram.

Arnica Montana (*Leopard's Bane*).—Arnica is a stimulant in adynamic diseases; in small doses, it increases the perspiration and accelerates the pulse. Is used as a tonic in rheumatism and diseases of the bladder, but more particularly as a domestic remedy in sprains, bruises, rheumatism and local inflammation.
Fluid Extract—Dose: 10 to 60 drops.

Artemesia Abrotanum (*Southernwood*). Tonic and antispasmodic. Administered, with benefit, in intermittents to increase the appetite, in atonic dyspepsia, to promote the early re-establishment of the digestive functions to their normal state.
Fluid Extract—Dose: 30 to 60 drops.

Artemesia Vulgaris (*Mugwort*).—Anthelmintic and tonic. Mugwort is reputed beneficial in epilepsy, hysteria and amenorrhea. It has been used successfully in fevers.
Fluid Extract—Dose: 20 to 40 drops.

Artemisia Absinthium (*Wormwood*).—Anthelmintic, tonic and narcotic. Used in intermittent fever, jaundice and worms. Promotes the appetite in atonic dyspepsia, amenorrhea, obstinate diarrhea, &c. Externally, it is useful in fomentations for bruises and local inflammations.
Fluid Extract—Dose: ½ to ½ drams.
Solid Extract—Dose: 3 to 5 grains.

Arum Triphyllum (*Wild Turnip*).—Acrid, expectorant, diaphoretic. Recommended in flatulence, croup, whooping cough, stomatites, asthma, chronic laryngitis, bronchitis, low stage of typhus fever, and various affections connected with a cachectic state of the system.
Fluid Extract—Dose: 10 to 20 drops.

Asclepias Incarnata (*White Indian Hemp*).—Emetic, cathartic and diuretic. Useful in catarrh, asthma, rheumatism, syphilis and worms.
Fluid Extract—Dose: 20 to 40 drops.
Solid Extract—Dose: 3 to 5 grains.
Pills—2 grains.

Asclepias Tuberosa (*Pleurisy Root*).—Pleurisy Root is carminative, tonic and diuretic; used in pleurisy, pneumonia, catarrh, febrile diseases, acute rheumatism, and dysentery. Efficient in flatulency and indigestion.
Fluid Extract—Dose: ½ to 2 drams.
Asclepin—Dose: 1 to 5 grains.
Pills—1 grain.

Aspidium Filix Mas (*Male Fern*).—Its specific property is anthelmintic. The accounts of its efficacy in the treatment of tapeworm are too numerous to admit of any reasonable doubt on the subject.
Fluid Extract—Dose: ½ to 2 drams.
Solid Extract—Dose: 3 to 15 grains.
Pills—2 grains

Atropa Belladonna (*Belladonna*).—Belladonna is a powerful narcotic, possessing also diaphoretic and diuretic properties. Exceedingly valuable in convulsions, neuralgia, whooping-cough, rheumatism, gout, paralysis, and similar diseases having their seat chiefly in the nervous system. It is esteemed as a prophylactic in scarlatina, and is also used with success in quinsy and hernia.
Fluid Extract—Dose: 3 to 10 drops.
Solid Extract—Dose: ¼ to 1 grain.
Pills—¼, ½ and 1 grain.

Aurantii Cortex (*Orange Peel*).—It is a mild tonic, carminative, and stomachic, but is seldom used alone. It is a useful addition to bitter infusions and decoctions.
Fluid Extract—Dose: ½ to 2 drams.

Baptisia Tinctoria (*Wild Indigo*).—Principally used on account of its antiseptic virtues It is an excellent application as a wash or gargle to all species of ulcers, as malignant ulcerous sore mouth and throat, mercurial sore mouth, scrofulous and syphilitic ophthalmia, &c.
Fluid Extract—Dose: ½ to ½ dram.
Baptisin—Dose: ¼ to ½ grain.

Barosma Crenata (*Buchu*).—Buchu is given chiefly in complaints of the urinary organs attended with increased uric acid, as gravel, chronic catarrh of the bladder, morbid irritation of the bladder and urethra; also in dyspepsia, chronic rheumatism, cutaneous affections, and dropsy.
Fluid Extract—Dose: ½ to 2 drams.

Buchu Compound—Composed of *Buchu, Uva Ursi, Juniper* and *Cubebs*.
Fluid Extract—Dose: ½ to 2 drams.

Benzoin, Odoriferum (*Fever Bush*).—Aromatic, stimulant, and tonic. Useful in the management of ague and typhoid forms of fevers, as a refrigerant and exhilarant in various febrile conditions, for allaying excessive heat and uneasiness.
Fluid Extract—Dose: ½ to 1 dram.

Berberis Vulgaris (*Barberry*).—Tonic and laxative Used in cases where tonics are indicated. Mild in its operation, and favorably spoken of in the treatment of jaundice, chronic diarrhea and dysentery, cholera infantum, &c. Serviceable as a wash or gargle in apthous sore mouth and in chronic opthalmia.
Fluid Extract—Dose: ½ to 1 dram.

Canella Alba (*Canella*).—Canella is possessed of the ordinary properties of aromatics; acts as a local stimulant and gentle tonic; valuable as an addition to tonic or purgative medicines in debilitated states of the digestive organs. Seldom prescribed except in combinations.
Fluid Extract—Dose: 15 to 30 drops.

Cannabis Indica (*Indian Hemp, Foreign*).—Phrenic, anæsthetic, antispasmodic, and hypnotic. Unlike opium, it does not constipate the bowels, lessen the appetite, create nausea, produce dryness of the tongue, check pulmonary secretions, or produce headache. Used with success in hysteria, chorea, gout, neuralgia, acute and sub-acute rheumatism, tetanus, hydrophobia, and the like.
Fluid Extract—Dose: 5 to 10 drops.
Solid Extract—Dose: 1 to 2 grains.
Pills—½ to 1 grain.

Capsicum Annuum (*Cayenne Pepper*.)—A powerful stimulant, and a condiment; is very useful in correcting flatulency in dyspepsia; promoting digestion; in sea-sickness; on the first occasion of nausea; in dropsies; in malignant sore throat and scarlet fever; as a gargle; in intermittents, with Quinine, and low forms of fever; in cholera; and in hot climates, for obviating the black vomit.
Fluid Extract—Dose: 5 to 15 drops.
Pills—1 grain.

Cassia Acutifolia (*Senna*).—It is well adapted to cases which require an active and certain purgative; in constipation and inactivity of the alimentary canal, requiring frequent use of purgatives; in worms; in determination of blood to the head. It can be used by persons of all ages as a purgative, with security.
Fluid Extract—Dose: 1 to 2 drams.
Solid Extract—Dose: 3 to 8 grains.
Pills—2 grains.

Senna, Aqueous.—A mild and sure purgative, with properties similar to the last.
Fluid Extract—Dose: 1 to 2 drams.

Senna and Jalap.—This is a concentrated form of the compound powder of Jalap, and is a good antibilious cathartic.
Fluid Extract—Dose: ½ to 1 dram.

Cephælis Ipecacuanha (*Ipecac*).—It is a mild and tolerably certain emetic, and being usually thrown from the stomach in one or two efforts, it is not apt to produce dangerous effects. It is especially useful when poisons have been swallowed; in cases of dysentery; as a nauseate in asthma, whooping-cough, and the hemorrhages; and as an expectorant in catarrhal and other pulmonary affections.
Fluid Extract—Dose: Expectorant, 5 to 10 drops; Emetic, ½ to 1 dram.
Pills of Ipecac—½ grain.
Pills of Ipecac and Opium—(½ gr. Op., ½ gr. Ip., 1 gr. Sul. Pot.) 2 grains.
Pills of Ipecac and Opium—(1 gr. Op., 1 gr. Ip., 2 grs. Sul. Pot.) 4 grains.
Pills of Ipecac and Squill—3 grains.

Chelidonium Majus (*Great Celandine*).—As a drastic hydragogue, fully equal to gamboge. Useful in hepatic affections, and is supposed to exert a special influence on the spleen. Applied in the form of a poultice to scrofulous and cutaneous diseases and piles; also, to indolent ulcers, fungous growth, &c.
Fluid Extract—Dose: 10 to 20 drops.
Solid Extract—Dose: 5 to 10 grains.

Chelone Glabra (*Balmony*).—Tonic, cathartic, and anthelmintic. Valuable in jaundice and hepatic diseases, likewise for the removal of worms. Used as a tonic, in small doses, in dyspepsia, debility of the digestive organs, and during convalescence from febrile and inflammatory diseases.
Fluid Extract—Dose: 1 dram.
Chelonin—Dose: 1 to 2 grains.

Chenopodium Anthelminticum (*Wormseed*).—Wormseed is one of our most efficient indigenous anthelmintics, and it is thought to be particularly adapted to the expulsion of the round worms in children. A dose of it is usually given before breakfast in the morning, and at bedtime in the evening, for three or four days successively, and then followed by some brisk cathartic.
Fluid Extract—Dose: 1 to 2 drams.

Chimaphila Umbellata (*Pipsissewa. Prince's Pine*).—Tonic, diuretic, and astringent. Highly recommended in dropsy; useful in disordered digestion and general debility, rheumatism, nephritic affections, and scrofula; in obstinate, ill-conditioned ulcers; in cutaneous eruptions; and in chronic affections of the urinary organs.
Fluid Extract—Dose: 1 dram.
Solid Extract—Dose: 10 to 20 grains.
Pills—3 grains.

Cimicifuga Racemosa (*Black Cohosh*).—This remedy possesses an undoubted influence over the nervous system, and has been successfully used in chorea, epilepsy, nervous excitability, asthma, delirium tremens, and many spasmodic affections. In febrile diseases it frequently produces diaphoresis and diuresis.

Fluid Extract—Dose: ½ to 2 drams.
Solid Extract—Dose: 4 to 8 grains.
Cimicifugin—Dose: 1 to 6 grains.
Pills of Cimicifugin—1 grain.

BLACK COHOSH COMPOUND—Composed of *Black Cohosh, Wild Cherry, Ipecac, Liquorice* and *Seneka*.
Fluid Extract—Dose: ½ to 1 dram.

Cinchona (*Peruvian Bark*).—Valuable in functional derangements of the stomach, improving digestion, and invigorating the nervous and muscular systems in diseases of general debility, and in convalescence from exhausting diseases. As a tonic it will be found of advantage in measles, small-pox, scarlatina, during the absence of fever or inflammation, also in cases where the system is exhausted by purulent discharges. It may likewise be used in all chronic diseases attended with debility, as scrofula, dropsy, obstinate cutaneous diseases, &c. To obtain this antiperiodic influence, the red and yellow barks are considered superior to the pale, while the pale is preferred as a tonic.
Fluid Extract of Cinchona—Dose: ½ to 1 dram.
Fluid Extract of Cinchona, Red—Dose: ½ to 1 dram.
Fluid Extract of Cinchona, Calasaya—Dose: ½ to 1 dram.
Elixir Calasaya—Dose: 1 to 2 dram.
Elixir Calasaya, Iron, Pyrophosphate—Dose: 1 to 2 drams.
Elixir Calasaya, Iron and Bismuth—Dose: 1 to 2 drams.
Elixir Calasaya, Iron and Strychnia—Dose: ½ to 2 drams.

CINCHONA COMPOUND—Composed of *Cinchona, Orange Peel, Gentian, Serpentaria, Cloves* and *Red Saunders*.
Fluid Extract—Dose: ½ to 1 dram.

Cissampelos Pareira (*Pareira Brava*).—Useful in calculous affections, diseases of the urinary passages, chronic inflammation and ulceration of the kidneys and bladder. It allays irritability of the bladder, and corrects the disposition to profuse mucous secretions.
Fluid Extract—Dose: ½ to 1 dram.

Cocculus Palmatus (*Colombo*).—Mild tonic. Used in simple dyspepsia; in those states of debility which attend convalescence from acute disorders, particularly in enfeebled condition of the alimentary canal, in dysentery, cholera morbus and cholera infantum.
Fluid Extract—Dose: 20 to 60 drops.
Solid Extract—Dose: 4 to 10 grains.
Pills—2 grains.

Colchicum Autumnale.—Colchicum is principally used in the various forms of gout and rheumatism, in which experience has abundantly proved it to be a highly valuable remedy. It is also recommended in inflammatory and febrile diseases, diseases of the heart, in various nervous complaints, as chorea, hysteria, and hypochondriasis, and chronic bronchial affections.
Fluid Extract of Colchicum Root—Dose: 3 to 12 drops.
Fluid Extract of Colchicum Seed—Dose: 5 to 15 drops.
Pills—½ grains.

Comptonia Asplenifolia (*Sweet Fern*).—Tonic, astringent and alterative. It possesses all the properties of the tonic and astringent balsams, and is useful in dysentery, diarrhea, hemoptysis and leucorrhea. Barton recommends it for summer complaints of children.
Fluid Extract—Dose: ½ to 1 dram.

Conium Maculatum (*Poison Hemlock*).—Powerful narcotic. Anodyne, antispasmodic, and deobstruent. Used in chronic enlargement of the liver, chronic rheumatism, syphilis, neuralgic affections, asthma, &c.
Fluid Extract—Dose: 5 to 20 drops.
Solid Extract—Dose: ½ to 1½ grains.
Pills—¼, ½ and 1 grain each.
Pills of Conium and Ipecac—1 grain

Convallaria Multiflora (*Solomon's Seal*).—Tonic, mucilaginous and mildly astringent. Of much value in leucorrhea, menorrhagia, female debility and pectoral affections. An infusion will be found of great efficacy in irritable conditions of the intestines, as well as in chronic inflammations of these parts, especially when attended with burning sensations, pains, &c.
Fluid Extract—Dose: 2 to 6 drams.

Coptis Trifolia (*Gold Thread*).—Simple tonic bitter. It closely resembles quassia in properties, and is employed when a pure tonic is desired. It proves serviceable in atonic dypepsia and loss of appetite. Much used as a gargle in various ulcerations of the mouth.
Fluid Extract—Dose: ½ to 1 dram.

Cornus Florida (*Boxwood, Dogwood*).—Tonic, astringent and stimulant. Its internal use increases the force and frequency of the pulse and elevates the temperature of the body. It has been successfully substituted for cinchona in the treatment of intermittents.
Fluid Extract—Dose: ½ to 2 drams.
Solid Extract—Dose: 5 to 10 grains.
Cornin—Dose: 1 to 10 grains.
Pills of Cornus, Extract—2 grains.
Pills of Cornin—2 grains.

Corydalis Formosa (*Turkey Corn*).—One of the best remedies in syphilitic affections; valuable in scrofula, and possesses tonic properties similar to the gentian, colombo, or other pure bitters. Its alterative powers render it of immense value.
Fluid Extract—Dose: 10 to 40 drops.
Corydalin—Dose: ½ to 1 grain.

Crocus Sativus (*Saffron*).—Emmenagogue and diaphoretic. Has been of benefit in amenorrhea, dysmenorrhea, chlorosis, hysteria, and in suppression of the menstrual discharge. It is a well-known domestic remedy in promoting the eruption in exanthematous diseases. It imparts color and flavor to officinal tinctures.
Fluid Extract—Dose: 20 to 60 drops.

Croton Eleuteria (*Cascarilla*).—A pleasant and gentle aromatic and tonic; employed in dyspepsia, chronic diarrhea and dysentery, flatulent colic and other cases of debility of the stomach and bowels, and to arrest vomiting. Cascarilla counteracts the tendency of cinchona to produce nausea.
Fluid Extract—Dose: 20 to 30 drops.

Cucumis Colocynthis (*Colocynth*).—Colocynth is a powerful drastic, hydragogue cathartic, exciting inflammation of the mucous membranes of the intestines, causing severe griping, vomiting and bloody discharges. From its powerful and harsh action it is rarely used alone. It is principally useful in passive dropsy, in cerebral derangements, and for the purpose of overcoming torpid conditions of the biliary and digestive system.
Solid Extract—Dose: 5 to 15 grains.
Solid Extract of Colocynth Compound—Dose: 2 to 30 grains.
Pills of Colocynth, Comp. Ext.—3 grains.
Pills of Colocynth, Comp. Ext. and Blue Pill—3 grains.
Pills of Colocynth, Com. Ext. and Ipecac—3 grains.
Pills of Colocynth, Comp. Ext. and Hyoscyamus—3 grains.
Pills of Colocynth, Comp. Ext. and Calomel—3 grains.
Pills of Colocynth, Comp. Ext and Podophyllin.

Curcuma Longa (*Turmeric*).—Stimulant, aromatic, tonic, discussive and healing; used especially in the jaundice and the itch; also employed in debilitated states of the stomach, intermittent fever and dropsy.
Fluid Extract—Dose: 2 to 3 drams.

Cypripedium Pubescens (*Ladies' Slipper*).—Tonic, nervine, antispasmodic. Employed in nervous headache, nervous irritability and excitability, hysteria, neuralgia, morbid condition of the nervous system, &c

Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 5 to 15 grains
Cypripedin—Dose: 2 to 4 grains.
Pills—2 grains.

Datura Stramonium (*Stramonium*).—Narcotic, antispasmodic, anodyne, sedative. Employed in tetanus, mania, epilepsy, chorea, palsy, and various nervous affections. Effectual in many acute pains, as in those arising from chronic diseases, or acute uterine affections, &c.
Fluid Extract—Dose: 5 to 20 drops.
Solid Extract—Dose: ¼ to 1 grain.
Pills—¼ to 1 grain.

Digitalis Purperea (*Foxglove*).—Is narcotic, sedative and diuretic; sometimes emetic and purgative. It is prescribed as a sedative in hypertropy of the heart, and in aneurism of the large vessels proceeding from it; in inflammatory diseases; in dropsy, on account of its great diuretic power; in hemorrhage, as a sedative. It possesses great power over the circulation, and is peculiar in its operation. It is one of those remedies which should never be administered without an accurate knowledge of their medicinal properties.
Fluid Extract—Dose: 5 to 10 drops
Solid Extract—Dose: ¼ to 1 grain.
Pills of Digitalin—1-32 grain.
Pills of Digitalis, Ext.—¼ grain.

Dioscorea Villosa (*Wild Yam*).—Antispasmodic. Successfully used in bilious colic. Held to be as much a specific in bilious colic as quinia in intermittents.
Fluid Extract—Dose: 5 to 30 drops.
Dioscorein—Dose: 1 to 6 grains.

Dipterix Odorata (*Tonqua*).—Tonqua is employed principally to flavor unpalatable medicines and for perfumery.
Fluid Extract—

Epigæa Repens (*Trailing Arbutus*).—Diuretic and astringent. Is highly beneficial in gravel and all diseases of the urinary organs. It is prepared and administered in the same way with the uva ursi and buchu. It acts similarly, and has given relief in cases where these have failed.
Fluid Extract—Dose: 1 to 2 drams.

Erechthites Hieracifolius (*Fireweed*).—Tonic, astringent and alterative. Is reported serviceable in diseases of the mucous tissues of the lungs, stomach and bowels, in the treatment of cholera, and dysentery, and summer complaints of children, as almost a specific for all active hemorrhages. Useful in spasms of stomach and bowels, hysteria, and diarrhea of pregnant females.
Fluid Extract—Dose: ½ to 1 dram.

Ergota (*Ergot*).—Ergot operates with great energy upon the contractile property of the uterus. It has been given to promote the expulsion of the placenta, to restrain inordinate hemorrhages after delivery, and to hasten the discharge of the fœtus in protracted cases of abortion.
Fluid Extract—Dose: ½ to 1 dram.
Pills—1 grain.

Euonymus Atropurpureus (*Wahoo*).—Tonic, laxative, alterative, diuretic and expectorant; successfully used in intermittents, dyspepsia, torpid state of the liver, constipation, dropsy, and pulmonary affections.
Fluid Extract—Dose: 1 to 2 drams.

Eupatorium Perfoliatum (*Boneset*).—Tonic, diaphoretic; and in large doses, emetic and aperient. Used in colds, fevers, catarrhs, remittent and intermittent fevers, typhoid pneumonia, dropsy, dypepsia and general debility. The *Eupurpurin*, from the *E. Purpureum*, is a most powerful diuretic. Used with excellent effect in all chronic urinary disorders.
Fluid Extract—Dose: 1 to 2 drams.
Solid Extract—Dose: 5 to 20 grains.
Eupatorin—Dose: 1 to 2 grains.
Eupurpurin—Dose: 3 to 4 grains.
Pills—2 grains.

Eupatorium Purpureum (*Queen of the Meadow*).—The root is bitter, astringent, stimulant and powerfully diuretic. It is useful in all diseases of the urinary organs, dropsy, rheumatism, gout, and female weaknesses and obstructions. Highly recommended in gravelly complaints, cystitis, nephritis, diabetes insipidus, incontinence of urine, &c.
Fluid Extract—Dose: 1 to 3 drams.
Eupurpurin—Dose: 3 to 4 grains.

Galium Aperine (*Cleavers*).—Valuable as a refrigerant and diuretic, and beneficial in many diseases of the urinary organs, as suppression of urine, calculous affections, inflammation of the kidneys and bladder, and in the scalding of urine in gonorrhea. It is contra-indicated in diseases of a passive character, on account of its refrigerant and sedative effects upon the system, but may be used freely in fevers and all acute diseases.
Fluid Extract—Dose: 1 to 2 drams.

Gaultheria Procumbens (*Wintergreen*).—Stimulant, aromatic and astringent. It is used in infusion in chronic diarrhea, as a diuretic in dysury, and as an emmenagogue.
Fluid Extract—Dose: 2 to 4 drams.

Gelseminum Sempervirens (*Yellow Jessamine*).—It is an excellent febrifuge; has proved efficacious in nervous and bilious headache, colds, pneumonia, hemorrhage, chorea, though it is in fevers especially in which its efficacy has been mostly observed. May be used in all forms of neuralgia, nervous headache, toothache, lockjaw or tetanus.
Fluid Extract—Dose: 3 to 20 drops.
Gelseminin—¼ to 2 grains.

Gentiana Lutea (*Gentian*).—It is a valuable tonic, adapted to those cases requiring the use of pure or simple bitters. It excites the appetite, invigorates the powers of digestion, and may be used in all cases of diseases dependent on pure debility of the digestive organs, or requiring a general tonic. It has proved useful in dyspepsia, gout, hysteria, scrofula, intermittent fever, diarrhea, and worms, but is rather applicable to the condition of the stomach and system generally, than to any specific disease.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 2 to 15 grains.
Pills—2 grains.

Gentian Compound—Composed of *Gentian*, *Orange Peel*, *Cloves*, *Canella* and *Red Saunders*.
Fluid Extract—Dose: ½ to 1 dram.

Geranium Maculatum (*Cranesbill*).—A powerful astringent. Used in chronic diarrhea, cholera infantum, hemorrhage, &c. It forms an excellent local application as a gargle in sore throats and ulcerations of the mouth, and is adapted to the treatment of such discharges as continue from debility, after the removal of their exciting causes. The absence of unpleasant taste, and all other offensive qualities, renders it peculiarly serviceable in the cases of infants, and of persons with very delicate stomachs.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 3 to 15 grains.
Geraniin—Dose: 1 to 5 grains.
Pills of Geraniin—Dose: 1 grain.
Pills of Ex. Geranium—2 grains.

Geum Rivale (*Avens' Root*).—Tonic and astringent. Used in numerous diseases, as chronic hemorrhages, chronic diarrhea and dysentery, leucorrhea, dyspepsia, phthisis, congestions of the abdominal viscera, intermittents, ulcerations, &c
Dose: ½ to 1 dram.

Gillenia Trifoliata (*Indian Physic*).—It is a mild and tolerably certain emetic; and being usually thrown from the stomach in one or two efforts, it is not apt to produce dangerous effects. It is especially useful when poisons have been swallowed; in cases of dysentery; as a nauseate in asthma, whooping-cough, and the hemorrhages; and as an expectorant in catarrhal and other pulmonary affections.
Fluid Extract—Dose: 4 to 12 drops

Glycyrrhiza (*Liquorice*).—Liquorice is an agreeable demulcent and expectorant. The extract is widely employed as a corrigent in the preparation of many unpalatable medicines. As a remedial drug it may be used in catarrhal and bronchial affections, coughs, pulmonary and hectic cases attended with thirst, also to allay irritation of the urinary organs, and the pain in diarrhea.
Fluid Extract—Dose: 1 to 4 drams.

Gossypium Herbaceum (*Cotton*).—Emmenagogue, parturient and abortive. It acts with as much efficiency and more safety than ergot. It operates without pain or gastric disturbance, producing no other effect than the excitation of the menstrual secretions, except perhaps some degree of anodyne influence. It is an excellent remedy in the treatment of chloretic and anæmic females.
Fluid Extract—Dose: 4 drams.

Hæmatoxylon Campechianum (*Logwood*).—It is tonic and astringent, without any irritating properties. May be used with much advantage, in diarrhea, dysentery, and in the relaxed condition of the bowels succeeding cholera infantum.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 5 to 30 grains.
Pills—2 grains.

Hamamelis Virginica (*Witch Hazel*).—Witch Hazel is tonic, astringent and sedative; used in hemoptysis, hematemesis and other hemorrhages, as well as in diarrhea, dysentery, and excessive mucous discharges; in incipient phthisis, in which it is supposed to possess an anodyne influence; also for sore mouth, painful tumors.
Fluid Extract—Dose: 1 to 2 drams.

Helianthemum Canadense (*Frostworth*).—This herb appears to possess tonic and astringent properties. Dr. Ives, of New Haven, Ct., is said to have first introduced it into regular practice. He regards it a very efficient remedy in scrofula. Dr. D. A. Tyler, of the same city, also speaks highly of this plant, and claims it may be used with decided advantage in strumous affections, secondary syphilis, as a gargle in scarlatina and as a wash in prurigo.
Fluid Extract—Dose: 1 to 2 drams.

Helleborus Niger (*Black Helebore*).—It is a drastic hydragogue cathartic, possessed of emmenagogue powers; occasionally found useful in chlorosis, amenorrhea, &c.
Fluid Extract—Dose: 10 to 20 drops.
Solid Extract—Dose: 1 to 6 grains.
Pills—1 grain.

Helonias Dioica (*False Unicorn*).—Tonic, diuretic and vermifuge. Beneficial in colic, and in atony of the generative organs. It acts as a uterine tonic in leucorrhea, amenorrhea, and to remove the tendency to repeated and successive miscarriages.
Fluid Extract—Dose: 1 to 3 drams.
Helonin—Dose: ½ to 1 grain.

Hepatica Americana (*Liverwort*).—Liverwort is a very mild, demulcent tonic and astringent, supposed by some to possess diuretic and deobstruent virtues. It has been used in fevers, hepatic complaints, hemoptysis, coughs, &c.
Fluid Extract—Dose: 2 to 3 drams.

Humulus Lupulus (*Hop*).—Hops are tonic and moderately narcotic, and have been recommended in diseases of local and general debility, associated with morbid vigilance, or other nervous derangements. Useful in dyspepsia and the nervous tremors, wakefulness and delirium of drunkards.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 5 to 20 grains.
Lupulin—Dose: 6 to 10 grains.

Hydrangea Arborescens (*Hydrangea*).—This plant was introduced to the medical profession by Dr. S. W. Butler, of Burlington, N. J., as a remedy for the removal of calculous or stony deposits in the bladder, and for relieving the excruciating pain attendant on the passage of a calculus through the urethra. The power of curing stone in the bladder is not claimed for it; it is only while the deposits are small, when in that form of the disease known as gravel, that it is an efficient remedy; then by removing the nucleus, which if allowed to remain in the organ would increase in size and form stone, the disease is averted.
Fluid Extract—Dose: 1 to 2 drams.

Hydrastis Canadensis (*Golden Seal*).—Used in dyspepsia, chronic affections of the nervous coats of the stomach, erysipelas, remittent, intermittent and typhoid fevers, stupor of the liver, and where tonics are required. In combination with geranium it forms an efficient remedy in chronic diarrhea and dysentery.
Fluid Extract—Dose: ½ to 2 drams.
Solid Extract—Dose: 2 to 5 grains.
Hydrastin (*Resinoid*)—Dose: ½ to 5 grains.
Hydrastin (*Neutral*)—Dose: 2 to 6 grains.
Hydrastina (*Alkaloid*)—Dose: 1 to 5 grains.
Pills—1 grain.

Hyoscyamus Niger (*Henbane*).—It ranks among the narcotics. It accelerates the circulation, increases the general warmth, occasions a sense of heat in the throat, and after a short period induces sleep. It does not constipate like opium, but often proves laxative. It is most frequently applied in neuralgic and spasmodic affections, rheumatism, gout, hysteria, and various pectoral diseases, such as catarrh, pertussis, asthma, phthisis, &c.
Fluid Extract—Dose: 10 to 20 drops.
Solid Extract—Dose: ½ to 1 grain.
Hyoscyamin—Dose: ⅛ to ½ grain.
Pills—¼, ½ and 1 grain.

Hypericum Perforatum (*Johnswort*).—Astringent, sedative and diuretic. It is beneficially administered in suppression of urine, chronic urinary affections, diarrhea, dysentery, worms, jaundice, menorrhagia, hysteria and hemoptysis. Externally applied to caked breasts, hard tumors and ecchymosis, it proves of service.
Fluid Extract—Dose: ½ to 1 dram.

Inula Helenium (*Elecampane*).—Aromatic, stimulant and tonic. Some claim it also has diuretic, diaphoretic, emmenagogue and expectorant properties. The chief use of Elecampane is in chronic pulmonary affections, weakness of the digestive organs, dyspepsia and cutaneous diseases, hepatic derangements and general debility.
Fluid Extract—Dose: ½ to 1 dram.

Ipomæa Jalapa (*Jalap*).—It is an active cathartic, operating briskly, and sometimes painfully upon the bowels, producing copious and watery stools. It is advantageously employed in dropsy, in the treatment of hip disease, and scrofulous affections of the other joints.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 3 to 8 grains
Jalapin—Dose: 1 to 2 grains.
Pills—1 grain.

Iris Florentina (*Orris*).—Possesses cathartic properties, and, in large doses, acts as an emetic. Chiefly used in compounds, on account of the agreeable odor it imparts.
Fluid Extract—To be used in compounds at discretion.

Iris Versicolor (*Blue Flag*).—A potent remedy in dropsy, scrofula, hepatic, renal and splenetic affections. It acts more particularly on the glandular system, and, in large doses, it evacuates and exhausts the system, acting on the liver, and the alimentary canal throughout, fulfilling most of the indications of mercury.
Fluid Extract—Dose: 20 to 60 drops.
Solid Extract—Dose: 1 to 4 grains.
Iridin—Dose: ½ to 5 grains.
Iridin, Pills of—½ and 1 grain.

Juglans Cinerea (*Butternut*).—A mild cathartic. Very efficacious in habitual constipation, dysentery and other affections of the bowels. It evacuates without debilitating the alimentary canal
Fluid Extract—Dose: 1 to 2 drams.
Solid Extract—Dose: 5 to 20 grains
Juglandin—Dose: 1 to 5 grains

Juniperus Communis (*Juniper Berries*).—Stomachic, carminative and diuretic. Employed with good success in cases of impairment of appetite and digestion; acts as a healthful stimulant in chronic affections of the bladder, gonorrhea, leucorrhea, gleet, and scorbutic diseases. Favorably spoken of by Van Swieten in ascites and anasarca.
Fluid Extract—Dose: 1 to 2 drams.

Juniperus Sabina (*Savin*).—It is highly stimulant, increasing most of the secretions, especially those of the skin and uterus, to the latter of which organs it seems to have a peculiar direction; though in cases of pregnancy it must be used with caution. Useful in complaints of the kidneys, suppression of urine and suppressed menstruation.
Fluid Extract—Dose: 10 to 30 drops.
Solid Extract—Dose: 1 to 5 grains.
Pills—1 grain.

Krameria Triandra (*Rhatany*).—It is a powerful astringent, with tonic properties. Used internally with advantage in menorrhagia, hematemesis, passive hemorrhages, chronic diarrhea, leucorrhea, chronic mucous discharges, and incontinence of urine; also as a local application in prolapsus ani, fissure of the anus, and leucorrhea.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 5 to 20 grains.
Pills—1 grain.

Lactuca Sativa (*Lettuce*).—Is usually given to quiet nervous irritability and allay cough. It may be given, when opium is indicated but cannot be given from idiosyncrasy of the patient. It does not produce that disturbance of the functions which usually follows opium.
Fluid Extract—Dose: ½ to 2 drams.
Solid Extract—Dose: 2 to 5 grains.
Pills—2 grains.

Lappa Minor (*Burdock*).—Useful in scorbutic, syphilitic, scrofulous, gouty, leprous and nephritic diseases. To prove effectual, its use must be persevered in for a long time. As an ointment, it has been employed with advantage in cutaneous diseases and obstinate ulcers.
Fluid Extract—Dose: 1 dram.
Solid Extract—Dose: 5 to 20 grains.
Pills—2 grains.

Laurus Sassafras (*Sassafras*).—Stimulant, and perhaps diaphoretic. It is used mainly as an adjuvant to other medicines, the flavor of which it improves. It has been particularly recommended in chronic rheumatism, cutaneous eruptions, scorbutic and syphiloid affections.
Fluid Extract—Dose: 1 to 2 drams.

Leontice Thalictroides (*Blue Cohosh*).—Possessed of diuretic, diaphoretic and anthelmintic properties; is a valuable agent in all chronic uterine diseases; appears to exert an especial influence upon the uterus; has been successfully employed in rheumatism, dropsy, colic, hiccough, epilepsy, uterine leucorrhea, amenorrhea, &c. In decoction, blue cohosh is preferable to ergot in expediting delivery, in all those cases where the delay is owing to debility, or want of uterine nervous energy, or is the result of fatigue.
Fluid Extract—Dose: 15 to 40 drops.
Solid Extract—Dose: 1 to 5 grains.
Caulophyllin—Dose: ½ to 4 grains.
Pills—2 grains.

Leonurus Cardiaca (*Motherwort*).—Recommended in nervous complaints, in irritable habits, delirium tremens, in all chronic diseases attended with restlessness, wakefulness, disturbed sleep, spinal irritation, neuralgic pains, and in liver affections.
Solid Extract—Dose: 3 to 6 grains.
Pills—2 grains.

Leptandra Virginica (*Culver's Root*).—Tonic, cholagogue and laxative; is employed in hepatic affections, as it acts upon the liver with energy and without active catharsis; in bilious and typhoid fevers as a laxative and tonic, and in dyspepsia, diarrhea and dysentery.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 1 to 10 grains.
Leptandrin—Dose: ½ to 1, and 1 to 2 grains.
Leptandrin, Pills of—1 grain.

Liatris Spicata (*Button Snakeroot*).—Diuretic, tonic, stimulant and emmenagogue. The infusion is efficacious in gleet, gonorrhea, and nephritic diseases; also in scrofula, dysmenorrhea, amenorrhea, after-pains, &c. Of advantage also as a gargle in sore throat.
Fluid Extract—Dose: 1 to 2 drams.
Liatrin—Dose: 4 to 8 grains.

Ligusticum Livisticum (*Lovage*).—Aromatic, stimulant; and has been employed as a carminative and diaphoretic. This drug has proved available in removing visceral obstructions, dispelling flatulency, in the treatment of jaundice and gravel. It is very often added to purgative preparations, on account of its aromatic carminative properties.
Fluid Extract—Dose: ½ to 1 dram.

Liriodendron Tulipifera (*White Wood*).—Aromatic, stimulant and tonic. This drug is recommended in intermittents, chronic rheumatism, chronic, gastric and intestinal diseases, hectic fever, night sweats, and colliquative diarrhea of phthisis.
Fluid Extract—Dose: ½ to 1 dram.

Lobelia Inflata (*Lobelia*).—Lobelia is emetic and cathartic; and in small doses, diaphoretic and expectorant. It is of especial advantage in spasmodic asthma, and is used in catarrh, croup, pertussis, and other laryngeal and pectoral affections. In cases where relaxation is required, either to subdue spasm or otherwise, lobelia will be found to be a valuable article.
Fluid Extract—Dose: Expectorant, 10 to 60 drops; Emetic, ½ to 1 dram.
Lobelin—Dose: ½ to 1½ grains.

Lobelia Compound—Composed of *Lobelia, Skunk Cabbage* and *Bloodroot.*
Fluid Extract—Dose: 10 to 60 drops; and ½ to 1 dram.

Lycopus Virginicus (*Bugle-weed*).—A mild narcotic, sedative, sub-astringent, styptic. A valuable remedy for hemorrhage from the lungs, incipient phthisis, pneumonia; useful in quieting irritation and allaying cough; it appears to act like digitalis in abating the frequency of the pulse, but it is far less active.
Fluid Extract—Dose: 1 to 2 drams.

Marrubium Vulgare (*Horehound*).—Tonic, aperient, pectoral and sudorific. Is largely employed in domestic practice in colds, asthma, catarrh and other chronic affections of the lungs, attended with coughs and copious expectoration.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 5 to 10 grains.
Pills—2 grains.

Mentha Piperita (*Peppermint*).—It is a powerful diffusive stimulant, antispasmodic, carminative and stomachic. Used in flatulent colic, hysteria, spasms, or cramp in the stomach; to allay the griping of cathartics; to check nausea and vomiting, and to disguise the unpleasant taste of other medicines.
Fluid Extract—Dose: 1 to 2 drams.

Mentha Viridis (*Spearmint*).—Like the last, it is carminative, antispasmodic and stimulant. It is mainly used as a diuretic and febrifuge. The tincture has been found serviceable in gonorrhea, strangury, gravel, &c.
Fluid Extract—Dose: 1 to 3 drams.

Myrica Cerifera (*Bayberry*).—Astringent and stimulant, and in large doses, is apt to occasion emesis. Successfully employed in scrofula, jaundice, diarrhea, dysentery, and other diseases where an astringent stimulant is indicated. Beneficial as a gargle in sore mouth and throat.
Fluid Extract—Dose: 1 to 2 drams.
Myricin—Dose: 2 to 10 grains.

Myrica Gale (*Sweet Gale*).—Astringent, stimulant. Dram doses are apt to produce emesis. It possesses properties similar to those of bayberry.
Fluid Extract—Dose: ½ to 1 dram.

Nepeta Cataria (*Catnip*).—Carminative and diaphoretic in warm infusion. Used in febrile diseases, in flatulent colic, nervous headache, hysteria and nervous irritability.
Fluid Extract—Dose: 2 to 4 drams.

Nymphæa Odorata (*White Lily*).—Astringent, demulcent, anodyne, alterative and antiscrofulous. It is a popular remedy in dysentery, diarrhea, leucorrhea, scofula and, combined with wild cherry, in bronchial affections.
Fluid Extract—Dose: ½ to 1 dram.

Opium.—The fluid extract of opium (aqueous) is of the same strength as laudanum, and is largely used in its stead; is anodyne in its action, promotes sleep, allays spasms and convulsions, and is valuable in nervous irritability. It can be used where laudanum or opium is generally applicable, without the unpleasant effects that usually follow from either. The fluid opium is denarcotized; prepared according to the U. S. Pharmacopœia.
Fluid Extract—Dose: 10 to 60 drops.

Papaver Somniferum (*Poppy*).—The poppy heads, though analogous to opium in medical properties, are exceedingly feeble. They are often given internally to calm irritation, to promote rest, and produce, generally, the narcotic effects of opium.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 3 to 10 grains.
Pills—2 grains.

Phytolacca Decandra (*Poke*).—It is a slow emetic, purgative, and somewhat narcotic. Used in chronic and syphilitic rheumatism, and for allaying syphilitic pains. It is said to be a sure cure for syphilis in all its stages, without the use of mercury. Acts as an alterative in scrofula and scrofulous diseases.
Fluid Extract—Dose: 10 to 30 drops.
Solid Extract—Dose: 1 to 4 grains.
Phytolaccin—Dose: ½ to 1 grain.
Phytolaccin, Pills of—½ grain.

Pinus Canadensis (*Hemlock*).—The extract prepared from the bark is a valuable remedy in the treatment of chronic diarrhea, in the last stages of dysentery, and cholera infantum. The astringent properties of hemlock seem to indicate its employment in hemorrhoids, menorrhagia, &c.
Fluid Extract—Dose: ½ to 1 dram.

Piper Angustifolium (*Matico*).—Principally styptic, also stimulant. Of advantage in epistaxis, leucorrhea, menorrhagia, chronic diarrhea, and diseases of the mucous membranes. As a local styptic it acts in the same manner as agaric.
Fluid Extract—Dose: ½ to 2 drams.

Piper Cubeba (*Cubebs*).—Cubebs are gently stimulant, with particular direction to the urinary organs; has the power of arresting excessive discharges from the urethra; used principally in the treatment of gonorrhea and gleet; also used beneficially in leucorrhea, abscess of the prostrate glands, piles, and chronic bronchial inflammation, &c.
Fluid Extract—Dose: ½ to 1½ drams.
Solid Extract—Dose: 2 to 20 grains.
Pills—2 grains.

Piper Nigrum (*Black Pepper*).—The black pepper is a warm carminative stimulant, having the property of producing general arterial excitement. Its chief medicinal application is to excite the languid stomach and correct flatulency.
Fluid Extract—10 to 40 drops.

Podophyllum Peltatum (*Mandrake*).—It is a certain cathartic; in large doses an emetic, alterative, anthelmintic, hydragogue and sialogogue. It rouses the liver to vigorous action, determines the blood to the surface, stimulates the kidneys, promotes expectoration, augments the glandular functions, and cleanses the intestinal canal of all irritating substances. In small doses, it acts as a powerful alterative. Useful in scrofulous and syphilitic diseases, hepatic affections, dysmenorrhea, rheumatism, gonorrhea; also administered beneficially in jaundice, dropsies, dysentery, diarrhea, bilious, remittent and intermittent fevers, puerperal fever, typhoid fever, and all glandular enlargements. Its range of application is perhaps more extensive than any other cathartic medicine, and is indicated in all cases where the use of mercury is indicated.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 3 to 12 grains.
Podophyllin—Dose: ⅛ to ½, and 1 to 3 grains.
Pills of Podophyllum, Ext.—1 grain.
Pills of Podophyllin—½ and 1 grain.
Pills of Podophyllin and Blue Pill—3 grains.

Mandrake Compound—Composed of *Mandrake*, *Senna* and *Jalap*.
Fluid Extract—Dose: 1 to 2 drams.

Polygonum Punctatum (*Water Pepper*).—Stimulant, diuretic, emmenagogue, antiseptic and vesicant. Used in colds, coughs, gravel, uterine diseases, &c.
Fluid Extract—Dose: 10 to 60 drops.
Solid Extract—Dose: 2 to 3 grains.

Polygala Senega (*Seneka*).—Seneka is a stimulating diuretic and expectorant, and in large doses, emetic and cathartic. It excites more or less all the secretions. It is peculiarly useful in chronic catarrhal affections, the secondary stages of croup, and in peripneumonia.
Fluid Extract—Dose: 20 to 40 drops.

Populus Tremuloides (*American Poplar*).—Tonic and febrifuge; has been used in intermittent fever with advantage. The fluid extract is reputed a valuable remedy in debility, want of appetite, feeble digestion, chronic diarrhea and worms. It is said to possess active diuretic properties.
Fluid Extract—Dose: ½ to 1 dram.
Populin—4 to 8 grains.

Prinos Verticillatus (*Black Alder*).—The black alder has been used with good effect in jaundice, diarrhea, intermittent fever and other diseases connected with a debilitated state of the system, especially gangrene and mortification. It is a popular remedy in gangrenous or flabby and ill-conditioned ulcers, and in chronic cutaneous eruptions, in which it is given internally, and applied locally in the form of a wash or poultice.
Fluid Extract—Dose: 1 to 2 drams.

Prunus Virginiana (*Wild Cherry*).—Tonic and stimulant in its operation on the digestive organs, at the same time exercising a sedative influence on the circulatory and nervous systems. It is useful in the convalescent stages of inflammatory attacks, and in many pulmonary diseases, imparting tonicity without exciting unduly the heart and blood vessels. It is of general use in phthisis, scrofula and dyspepsia.
Fluid Extract—Dose: 2 to 4 drams.
Prunin—Dose: 2 to 6 grains.

Wild Cherry Compound—Composed of *Wild Cherry*, *Horehound*, *Lettuce*, *Veratrum* and *Bloodroot*.
Fluid Extract—Dose: ½ to 2 drams.

Ptelea Trifoliata (*Ptelea*).—Pure, unirritating tonic. It is recommended in asthma, and pulmonary affections, intermittents and remittents, and in all cases where tonics are indicated. It has proved eminently worthy in gastro-enteric irritation, and is stated to be tolerated by the stomach when other remedies are rejected.
Fluid Extract—Dose: 15 to 60 drops.

Pulmonaria Officinalis (*Lungwort*.)—Demulcent and mucilaginous. Beneficially administered in cases of hemorrhage from the lungs, bronchial and catarrhal affections, and in pulmonary affections generally.
Fluid Extract—Dose: ½ to 1 dram.

Pyrethrum Parthenium (*Feverfew*).—Tonic and carminative, with emmenagogue, vermifuge and stimulant properties. This is an excellent agent in colds, flatulency, worms, hysteria, and in some types of febrile diseases and irregular menstruation.
Fluid Extract—Dose: ½ to 1 dram.

Quercus Alba (*White Oak*).—Tonic, astringent and alterative. As an astringent, it is very valuable! given in intermittent fevers, obstinate and chronic diarrhea, used as a gargle, and in baths for children. Applied externally as an ointment to ill-conditioned ulcers, piles, &c.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 10 to 20 grains.
Pills—2 grains.

Rhamnus Catharticus (*Buckthorn*).—A powerful hydragogue and purgative. Seldom used alone.
Fluid Extract—Dose: 1 to 1½ dram.

Rheum Palmatum (*Rhubarb*).—Used as a purgative in mild cases of diarrhea and cholera infantum; as a stomachic and tonic in dyspepsia accompanied with debilitated condition of the digestive organs; as a purgative for infants, it is valuable, and is well adapted to a variety of children's complaints.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 2 to 10 grains.
Pills Rhei, Ext.—1 grain.
Pills Rhei, U. S P.—4 grains.
Pills Rhei Comp. U. S. P.—4½ grains
Pills Rhei and Blue Pill—4 grains.
Pills Rhei and Iron—3 grains.

Rhubarb and Senna—By a union of these drugs in the concentrated form of a fluid extract, and in due proportion, a cathartic is obtained which is safe, unattended by unpleasant symptoms, and not followed by constipation.
Fluid Extract—Dose: ½ to 1 dram.

Rhubarb Aromatic—
Fluid Extract—Dose: ½ to 1 dram.

Rhus Glabrum (*Sumach*).—Tonic, astringent, antiseptic and diuretic. Valuable in gonorrhea, leucorrhea, diarrhea, dysentery, hectic fever and scrofula.
Fluid Extract—Dose: 1 to 2 drams.
Rhusin—Dose: 1 to 2 grains.

Rubus Villosus (*Blackberry*).—Tonic and strongly astringent. An excellent remedy in diarrhea, dysentery, cholera infantum, relaxed conditions of the intestines of children, passive hemorrhage from the stomach, bowels, and uterus, and in colliquative diarrhea.
Fluid Extract—Dose: ½ to 1 dram
Solid Extract—Dose: 4 to 6 grains.
Pills—2 grains.

Rumex Crispus (*Yellow Dock*).—Alterative, tonic, mildly astringent and detergent. Useful in scorbutic and syphilitic affections, leprosy, elephantiasis, &c.
Fluid Extract—Dose: 1 to 2 drams.
Solid Extract—Dose: 4 to 8 grains.
Rumin—Dose: 4 to 8 grains
Pills—2 grains.

Ruta Graveolens (*Rue*).—Its action is chiefly directed to the uterus; in moderate doses proving emmenagogue, and in large doses, producing a degree of irritation in that organ which sometimes determines abortion. It has been successfully used in flatulent colic, hysteria, epilepsy, and is an efficient vermifuge.
Fluid Extract—Dose: 20 to 40 drops.
Solid Extract—Dose: 2 to 4 grains.
Pills—2 grains.

Sabbatia Angularis (*Centaury, Red*).—An excellent tonic. One advantage claimed for this drug over many others is that it does not constipate. It is employed as a tonic in full periodic febrile diseases, both as a preventive and as a remedy, and as a bitter tonic in dyspepsia and convalescence from fevers, to invigorate the stomach and alimentary canal.
Fluid Extract—Dose: ½ to 2 drams.

Salix Alba (*Willow*).—Tonic and astringent, and has been employed as a substitute for quinia in intermittent fever. It is antispasmodic and febrifuge, and is less likely to offend the stomach and affect the nervous system than quinia.
Salicin—Dose: 2 to 10 grains.

Sambucus Canadensis (*Elder Flowers*).—The fluid extract made into a warm infusion is diaphoretic and gently stimulant, while the cold infusion is diuretic, cooling and alterative. Employed in hepatic derangements of children, erysipelatous and exanthematous affections. It is a superior laxative and refrigerant.
Fluid Extract—Dose: ½ to 1 dram.

Sanguinaria Canadensis (*Bloodroot*).—Valuable as an emetic, narcotic and stimulant. In small doses, it stimulates the digestive organs and accelerates the circulation, while in large doses, it produces nausea and consequent depression of the pulse. Used in typhoid pneumonia, catarrh, pertussis, scarlatina, rheumatism, jaundice, dyspepsia, &c. Considered a specific in the early stages of croup.
Fluid Extract—Dose: 5 to 15 and 40 to 60 drops.
Solid Extract—Dose: ½ to 1½ and 2½ to 5 grains.
Sanguinarin (*Resinoid*)—Dose: ½ to 1 and 1½ to 2 grains.
Sanguinarina (*Alkaloid*)—Dose: 1-30th to 1-10th grains.
Pills—½ and 1 grain.

Scilla Maritima (*Squill*).—Squill is expectorant, diuretic, and in large doses, emetic and purgative. As an expectorant, it is used both in cases of deficient and superabundant secretion from the bronchial mucous membrane. It is used in dropsy to increase the secretory action of the kidneys.
Fluid Extract—Dose: Expectorant and Diuretic, 2 to 6 drops; Emetic, 12 to 24 drops.

Squill Compound—Composed of *Squill* and *Seneka*.
Fluid Extract—Dose: 10 to 20 drops.
Pills of Squill Comp. U. S. P.—3 grains.

Scutellaria Lateriflora (*Scullcap*).—Scullcap is a valuable nervine. Those who have long used it, claim for it tonic properties, which give strength as well as quiet to the system, and that it does not, like other nervines, leave the system in an excited and irritable condition. Used in tic-douloureux, St. Vitus' dance, convulsions, tetanus as well as in ordinary diseases of the nerves.
Fluid Extract—Dose: ½ to 1 dram
Scutellarin—Dose: 2 to 6 grains.

Scullcap Compound—Composed of *Scullcap*, *Ladies' Slipper*, *Hop* and *Lettuce*.
Fluid Extract—Dose: ½ to 1 dram.

Senecio Aureus (*Life Root*).—Diuretic, pectoral, diaphoretic and tonic. An excellent remedy in gravel and other urinary affections; is said to be a specific in strangury; very efficacious in promoting menstrual discharges, and a valuable agent in the treatment of female diseases.
Fluid Extract—Dose: ½ to 1 dram.
Senecin—Dose: 3 to 5 grains.

Simaruba Excelsa (*Quassia*).—It possesses in the highest degree all the properties of simple bitters. It is purely tonic, invigorating the digestive organs, with little excitement of the circulation, or increase of animal heat. Particularly adapted to dyspepsia and to that debilitated state of the digestive organs which sometimes succeeds acute disease
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 3 to 5 grains.
Pills—1 grain.

Smilax Officinalis (*Sarsaparilla*).—Possesses a high reputation as an alterative in the treatment of chronic rheumatism, scrofulous affections, cutaneous affections, syphiloid diseases, and that depraved condition of the general health to which it is difficult to apply a name.
Fluid Extract—Dose: 1 dram.
Solid Extract—Dose: 5 to 20 grains.
Pills—3 grains.

Sarsaparilla Compound—Compounded of *Sarsaparilla*, *Prince's Pine*, *Liquorice*, *Mezereon*, *Sassafras*, *Yellow Dock* and *Bittersweet*.
Fluid Extract—Dose: 1 dram.
Solid Extract—Dose: 5 to 20 grains.

SARSAPARILLA AND DANDELION—
Fluid Extract—Dose: 1 dram.

Solanum Dulcamara (*Bittersweet*).—The fluid extract and syrup are widely used in cutaneous diseases, scrofula, jaundice, syphilitic, rheumatic and cachectic affections, leucorrhea and obstructed menstruation. Possesses feeble narcotic powers and increases the secretions of the kidneys and the skin. It is especially beneficial in the treatment of cutaneous eruptions of a scaly character.
Fluid Extract—Dose: ½ to 1 dram.
Solid Extract—Dose: 3 to 8 grains.
Pills—2 grains.

Solidago Odora (*Golden Rod*).—Aromatic, moderately stimulant and carminative. Useful to relieve pain arising from flatulency, to allay nausea, and to mask the taste of unpalatable medicines. Recommended in the convalescent stages of severe dysentery, diarrhea and cholera morbus.
Fluid Extract—Dose: ½ to 1 dram.

Spigelia Marilandica (*Pink Root*).—Powerful anthelmintic. Over-doses excite the circulation, and determine blood to the brain, giving rise to vertigo, dimness of vision, &c.
Fluid Extract—Dose: ½ to 1½ drams

PINK ROOT COMPOUND—Composed of *Pink Root*, *Senna*, *Savin* and *Manna*.
Fluid Extract—Dose: ½ to 2 drams.

PINK ROOT AND SENNA—
Fluid Extract—Dose: ½ to 1 dram.

Spiræa Tomentosa (*Hardhack*).—Tonic, astringent. As an astringent, it is administered in diarrhea, cholera infantum, and other complaints where astringents are usually indicated, and is said to be less liable to disagree with the stomach than other astringents.
Fluid Extract—Dose: 4 to 20 drops.

Statice Caroliniana (*Marsh Rosemary*).—Powerful astringent, with emetic and sudorific properties. It will be found efficacious in diarrhea and dysentery, particularly in the latter stages; in *cynanche maligna*, both as an internal and external application, and may be used for all the purposes for which kino and catechu are given.
Fluid Extract—Dose: 15 to 40 drops.

Stillingia Sylvatica (*Queen's Root*).—Stillingia has reputation as an alterative, and as such is used in syphilitic affections, ordinarily requiring the use of mercury; is emetic and cathartic in large doses. It has been used with efficacy in secondary syphilis, scrofula, cutaneous diseases, chronic hepatic affections, and other complaints generally benefited by alteratives.
Fluid Extract—Dose: 20 to 40 drops.
Stillingin—Dose: 2 to 5 grains.
Pills of Stillingin—1 grain.

STILLINGIA COMPOUND—Compounded of *Stillingia*, *Turkey Corn*, *Blue Flag*, *Prince's Pine*, *Prickly Ash*, *Yellow Dock*.
Fluid Extract—Dose: ½ to 1 dram

Strychnos Ignatia (*Ignatia Bean*).—It is applicable in the wide range of symptoms known as dyspeptic. It has a tonic, stimulating effect on all the organs connected with the digestive functions, by its acting directly on their nervous energies, exciting and equalizing their weakened and disturbed action. It possesses a large amount of strychnia, the active principle of the Nux Vomica.
Fluid Extract—Dose: 5 to 10 drops.
Solid Extract—Dose: ½ to 1½ grains.
Pills—½ grain.

Strychnos Nux Vomica (*Nux Vomica*).—Nux Vomica is a violent excitant of the cerebro-spinal system, and in large doses, is an active poison. In small doses, frequently repeated, it is tonic, diuretic, and even laxative. It is employed principally in the treatment of paralysis. It is said to be more beneficial in general palsy and paraplegia, than in hemiplegia, and has also been found of benefit in local palsies, as of the bladder; likewise in amaurosis, spermatorrhea and impotence.
Fluid Extract—Dose: 5 to 10 drops.
Solid Extract—Dose: ½ to 2 grains.
Pills of Strychnine—1-48, 1-32 and 1-16 grain.

Symphytum Officinale (*Comfrey*).—The therapeutic effects of Comfrey are due to its mucilaginous properties, which act upon the mucous membrane. It is demulcent, and somewhat astringent. Useful in diarrhea, dysentery, coughs, hemoptysis, other pulmonary affections, leucorrhea, and in female debility.
Fluid Extract—Dose: 2 to 4 drams.

Symplocarpus Fœtidus (*Skunk Cabbage*).—Stimulant, antispasmodic, expectorant and slightly narcotic. Useful in asthma, whooping cough, nervous irritability, hysteria, epilepsy, chronic catarrh, pulmonary and bronchial affections.
Fluid Extract—Dose: 20 to 80 drops.

Tanacetum Vulgare (*Double Tansey*).—Aromatic, tonic, and anthelmintic. The warm infusion, prepared from the fluid extract, is a very good emmenagogue and diaphoretic. Tansey will be found useful, in small doses, in hysteria and dyspepsia complicated with flatulency, and in convalescence from exhausting diseases. It is regarded especially serviceable to expel worms.
Fluid Extract—Dose: ½ to 1 dram.

Thymus Vulgaris (*Thyme*).—Tonic, carminative, emmenagogue and antispasmodic. Employed as a stimulating tonic in hysteria, dysmenorrhea, colic, cephalalgia, and in a debilitated state of the stomach.
Fluid Extract—Dose: ½ to 1 dram.

Taraxacum Dens-Leonis (*Dandelion*).—Valuable alterative, tonic, diuretic and aperient. It has a specific action on the liver, exciting it to secretion when languid. Used with good effect in dyspepsia, diseases of the liver and spleen, and in the irritable condition of the stomach and bowels.
Fluid Extract—Dose: 1 to 2 drams.
Solid Extract—Dose: 10 to 20 grains.
Pills—2 grains.

DANDELION COMPOUND—Composed of *Dandelion*, *Mandrake* and *Conium*.
Fluid Extract—Dose: 1 to 2 drams.

TARAXACUM AND SENNA.—In favor with many physicians as an antibilious purgative. Used successfully with children, who take it readily, seldom producing pain or nausea, and not likely to produce constipation. Used largely in place of castor oil.
Fluid Extract—Dose: 1 to 2 drams.

Trifolium Pratense (*Red Clover*).—Highly recommended in cancerous ulcers of every kind, and deep, ragged-edged, and otherwise badly conditioned burns.
Solid Extract—To be used at discretion.

Trillium Pendulum (*Bethroot*).—Astringent, tonic and antiseptic. It has been employed successfully in hematuria, leucorrhea, cough, asthma and difficult breathing.
Fluid Extract—Dose: 1 to 3 drams.
Trilliin—Dose: 4 to 8 grains.

Tussilago Farfara (*Coltsfoot*).—Emollient, demulcent and tonic. Employed in coughs, asthma, whooping cough, and pulmonary diseases, both acute and chronic.
Fluid Extract—Dose: ½ to 1 dram.

Valeriana Officinalis (*Valerian*).—Valerian is tonic and antispasmodic. It is useful in cases of irregular nervous action; in the morbid vigilance of fevers; in hypochondriasis, epilepsy, and occasionally in intermittent and remittent fevers.
Fluid Extract—Dose: ½ to 1½ drams.
Solid Extract—Dose: 3 to 10 grains.
Pills—2 grains.

Veratrum Viride (*American Hellebore*).—It is slightly acrid, an excellent expectorant, a certain diaphoretic, nervine, and never narcotic, emetic, and arterial sedative, which last is its most valuable and interesting property, and for which it stands unparalleled and unequaled as a therapeutic agent.
Fluid Extract—For full directions, see Book of Formulæ.
Solid Extract—Dose: ¼ to 1 grain.
Veratrin—Dose: 1-16th to ½ grain.
Pills—¼ and ½ grain.

Verbena (*Vervain*).—Tonic, emetic, expectorant and sudorific. The extract is pronounced valuable in intermittent fever, obstructed menstruation, in scrofula, and visceral obstructions. As an expectorant and palliative it is employed in catarrhal and bronchial affections.
Fluid Extract—Dose: ½ to 1 dram.

Viburnum Opulus (*Cramp Bark*).—Very effective in relaxing cramps and spasms of all kinds, as asthma, hysteria, cramps of the limbs or other parts in females, especially during pregnancy, or at the time of parturition, preventing the attacks entirely, if used daily for the last two or three months of gestation.
Fluid Extract—Dose: 1 to 2 drams.

Xanthoxylum Fraxineum (*Prickly Ash*).—Used in languid conditions of the system; in rheumatism, chronic syphilis and hepatic derangements. The Xanthoxylin may be used in all cases when it is desired to stimulate and strengthen mucous tissues.
Fluid Extract—Dose: 15 to 45 drops.
Xanthoxylin—Dose: 2 to 6 grains.
Pills—1 grain.

Zingiber Officinale (*Ginger*).—Ginger is a grateful stimulant and carminative, often given in dyspepsia, flatulency, and imperfect digestion, as well as in colic, nausea, gout, spasms, cholera morbus, &c.
Fluid Extract—Dose: ½ to 1½ drams.

SUGAR-COATED PILLS AND GRANULES
OF THE
UNITED STATES PHARMACOPŒIA,
AND OTHER RELIABLE FORMULÆ.

Aconitine (1-60 *grain*).—The active principle of Aconite. *Dose*—1 pill.

Aconite (¼, ½ *and* 1 *grain*).—It is used as an anodyne and sedative in all affections in which there is increase of nervous, vascular or muscular action. *Dose*—(½ grain) 1 to 4.

Aloetic (U. S. P., 4 *grains*).—*Aloes*, 2 *grains*, Soap, 2 grains. Laxative in habitual costiveness. *Dose*—1 to 3.

Aloes and Assafœtida (U. S. P., 4 *grains*).—*Aloes, Assafœtida and Soap, equal parts.* Applicable to costiveness attended with flatulence and debility of the digestive organs. *Dose*—2 to 5.

Aloes and Iron (U. S. P, 4 *grains*).—*Aloes Soct., and Conium, Ex., each one-half part; Iron, Sulphate and Ginger, Jamaica, each, one part.* Employed in constipation with debility of the stomach, especially when attended with amenorrhea. *Dose*—1 to 4.

Aloes and Mastich (3 *grains*).—Laxative. See Lady Webster's

Aloes and Myrrh (U. S. P., 4 *grains*).—*Aloes Soct., two parts; Myrrh and Saffron, one part each.* A warm, stimulant cathartic. *Dose*—3 to 5.

Aloes and Ext. Gentian (U. S. P., 4 *grains*).—See Gentian Compound.

Ammonium Bromide (1 *grain*).—Nervine and alterative. Peculiarly applicable to functional nervous diseases, more especially those of the ganglionic system. *Dose*—2 to 5.

Anderson's Socts. (2 *grains*)—*Aloes, Soct., Soap, Colocynth and Oil Annis.* Antibilious and purgative. An excellent pill for promoting the biliary secretions, and uniting an alterative with its purgative action. *Dose*—1 to 3.

Anthemis (2 *grains*).—A mild tonic, alterative and emetic. In small doses acceptable and corroborant to the stomach. *Dose*—1 to 6.

Antibilious (2¾ *grains*).—*Ext. Colocynth*, 2¼ *grains; Podophyllin*, ½ *grain.* Drastic, hydragogue cathartic. Recommended in dropsical affections, hepatic derangements, in cases where a brisk catharsis is indicated. *Dose*—1 to 4.

Antimonii Comp. (U. S. P., 3 *grains*).—Alterative. See Calomel Compound. *Dose*—1 to 3.

Apocynum (2 *grains*).—Alterative, tonic and laxative. Valuable in the treatment of chronic hepatic affections, dyspepsia, amenorrhea, scrofula, &c. *Dose*—1 to 4.

Aperient (2 5-6 *grains*)—*Ext. Nux Vomica*, ⅓ *grain; Ext. Hyoscyamus*, ½ *grain; Ext. Colocynth Comp*, 2 *grains.* Promotes excretions. Employed in confirmed torpor of the bowels. Ext. Hyoscyamus prevents tormina without impairing the energy of the other ingredients. *Dose*—1 to 2.

Arsenious Acid (1-32 *grain*).—Alterative and febrifuge. The principal diseases, in which it has been exhibited, are scirrhus and cancer of the lip, anomalous ulcers, intermittent fevers, chronic rheumatism, particularly that form of it attended with pains in the bones, hemicrania and periodical headache. *Dose*—1 to 3

Assafœtida (U. S P., 4 *grains*).—Powerful antispasmodic, moderate stimulant, efficient expectorant, and feeble laxative. *Dose*—2 to 4.

Assafœtida and Iron (U S. P., 3 *grains*).—*Assafœtida*, 2 *grains*; *Sulphate Iron*, 1 *grain.* Has especial reference to spasmodic affections, dependent on general debility of the system, and diseases attended with immoderate discharges. *Dose*—2 to 4.

Assafœtida and Rhei (3 *grs.*).—*Assafœtida, Rhei, Iron, by Hydrogen, each equal parts.* Tonic, laxative and antispasmodic combination. *Dose*—2 to 5.

Atropia (1-60 *grains*).—This alkaloid possesses the properties of Atropa Belladonna in a concentrated form. *Dose*—1 to 2.

Belladonna (¼, ½ *and* 1 *grain*).—Powerful narcotic; possessing diaphoretic and diuretic properties, and somewhat disposed to act upon the bowels. *Dose*—(¼ grain) 1 to 4.

Bismuth Sub-Nitrate (2 *grains*).—Absorbent, antispasmodic and slightly sedative and astringent. Has a very soothing influence upon irritated mucous surfaces. Principally employed in painful affections of the stomach, such as cardialgia, pyrosis, and gastrodynia; in spasmodic diseases; and in dysentery and diarrhea. *Dose*—2 to 4.

Bismuth, Sub-Carbonate (3 *grains*).—Readily tolerated by the stomach, soluble in the gastric juice, possesses the power to neutralize excess of acid in the stomach without any tendency to constipate. Recommended in the treatment of gastralgia following the phlegmasias of the digestive organs. *Dose*—2 to 4.

Blue Pill (U. S. P., 2½ *and* 5 *grains*).—Alterative, sialagogue and purgative. Less irritating than the other mercurials. Employed in constipation, biliary derangements, syphilitic diseases, and wherever the influence of mercury is needed. *Dose*—(2½ grains) 2 to 4; (5 grains) 1 to 3.

Blue Pill Compound (1¾ *grain*).—*Blue Pill*, 1 *grain; Opii*, ¼ *grain; Ipecac*, ½ *grain*. The energy of Blue Pill is increased by this combination, and its after effects rendered less objectionable. *Dose*—1 to 3.

Blue Pill and Podophyllin (3 *grains*).—See Podophyllin and Blue Pill.

Calomel (½, 1, 2, 3 *and* 5 *grains*).—Alterative and purgative. It is used as a purgative in torpid states of the bowels, torpor of the liver, worms, dropsy, &c.

Calomel Compound (Plummer's, U. S. P., 3 *grains*).—Alterative. Well adapted to the treatment of chronic rheumatism, and scaly and other eruptive diseases of the skin, especially when accompanied with a syphilitic taint. *Dose*—1 to 2.

Calomel and Opium (3 *grains*).—*Calomel*, 2 *grains; Opium*, 1 *grain*. The degree of irritation which ordinarily follows the administration of pure Calomel is diminished, while its laxative operation is increased by this combination. *Dose*—1 to 3.

Calomel and Rhei (1½ *grains*).—*Calomel*, ½ *grain; Ext. Rhei*, ½ *grain; Ext. Colocynth Comp.*, ½ *grain; Ext. Hyoscyamus*, 1-6 *grain*. A very safe and reliable laxative and cathartic, unattended by unpleasant results. *Dose*—2 to 4.

Calomel and Comp. Colocynth Ext. (3½ *grains*).—*Calomel*, 1 *grain; Ext. Colocynth Compound*, 2½ *grains*. Useful in obstinate constipation; possessing properties similar to Colocynth Comp. and Blue Pill. *Dose*—1 to 3.

Camphor and Opium (3 *grains*).—*Camphor*, 2 *grains; Opium*, 1 *grain*. Anodyne, diaphoretic and antispasmodic. Camphor is said to diminish the chance of the idiosyncratic effects of Opium. This composition is serviceable in chordee, hysteria, nymphomania, and in all irritation of the sexual organs. *Dose*—1 to 2.

Cannabis Indica (½ *and* 1 *grain*).—Efficient in checking spasmodic cough and cramp, and removing languor and anxiety. *Dose*—(1 *grain*) 1 to 2.

Capsicum (1 *grain*).—Promotes digestion and stimulates the genito-urinary organs. *Dose*—1 to 2.

Cathartic Compound (U. S. P., 3 *grains*).—*Ext. Colocynth Compound, Ext. Jalap, Calomel, Gamboge*.—Particularly adapted to the early stages of bilious fevers, to hepatitis, jaundice, and all those derangements of the alimentary canal, or of the general health, which depend on congestion of the portal circle. *Dose*—1 to 4.

Compound Cathartic Improved (3 *grs.*, without Calomel).—*Ext. Colocynth Compound, Ext. Jalap, Podophyllin, Leptandrin, Ext. Hyoscyamus, Ext. Gentian, Oil Peppermint*. Possesses the purgative, alterative, and cholagogue properties of the U. S. P. Compound Cathartic, at the same time not being open to the popular objection of including Calomel in its composition; and as a substitute for the U. S. P. pill, it is confidently recommended to the profession. *Dose*—1 to 3.

Chimaphila Ext. (3 *grains*).—It has proved very efficacious in many cutaneous diseases, scrofula, chronic rheumatic, nephritic, urinary and dropsical affections. *Dose*—3 to 6.

Chinoidine (2 *grains*).—Has the same medicinal power as Quinine. *Dose*—1 to 3.

Chinoidine Compound (3½ *grains*).—*Chinoidine*, 2 *grains; Ferri, Sulphate of Zinc*, 1 *grain; Piperini*, ½ *grain*. Useful in chlorosis, in anaemic conditions, in some types of amenorrhea, &c. *Dose*—1 to 2.

Cimicifugin (1 *grain*).—Tonic, alterative, nervine, and antiperiodic, with an especial affinity to the uterus. The active principle of Cimicifuga Racemosa. *Dose*—1 to 4.

Cinchona, Sulphate of (1½ *and* 3 *grains*).—Possesses nearly the same remedial virtues as the Sulphate of Quinia. Efficient as a tonic and antiperiodic. *Dose*—(1½ grain) 1 to 4.

Cochia (3 *grains*).—*Colocynth Compound, Aloes, gamboge, Scammony and Potass. Sulphate*. Actively cathartic. *Dose*—1 to 3.

Codeia (1-16 *grain*).—In the hands of M. Barbier it relieved painful affections having their seat in the great sympathetic. Dr. Aran considers it equal to Morphia in its efficiency to relieve pain. *Dose*—1 to 4.

Colchicum Ext. (½ *grain*). — Sedative Valuable in the treatment of gout and rheumatism, especially when these affections assume a neuralgic character. *Dose*—1 to 3.

Colocynth Compound Ext. (3 *grains*).—Exhibited beneficially in hepatic derangements. *Dose*—2 to 6.

Colocynth Compound Ext. and Blue Pill (3 *grains*).—*Colocynth Compound*, 2½ *grains; Blue Pill*, ½ *grain*. An excellent cholagogue and alterative combination. *Dose*—1 to 2.

Colocynth Compound and Ipecac (3 *grains*).—Ipecac renders the action of Colocynth Compound less violent, and at the same time increases its energy. *Dose*—2 to 4.

Colocynth Compound and Hyoscyamus (U. S. P. 3 *grains*).—Compound Extract of Colocynthis is said to be almost entirely deprived of its griping tendency by combining it with Hyoscyamus. *Dose*—1 to 6.

Colocynth Compound and Podophyllin.—[3 *grains*] *Colocynth Compound* 2½ *grains, Podophyllin* ½ *grain*.)—Antibilious cathartic. A potent substitute for Calomel when some idiosyncrasy of constitution or prejudice interdicts the use of the latter agent. If the stomach is acid, alkalies should previously be given. *Dose*—1 to 2.

Colocynth Compound and Calomel (3 *grains*).—Possesses properties analogous to the former pill. *Dose*—2 to 3.

Conium Ext. (¼, ½ *and* 1 *grain*).—Alterative and anodyne. Is administered in a variety of complaints. By some thought to possess a curative influence over malignant tumors. *Dose*—(½ grain) 2 to 6.

Conium and Ipecac (U. S. P., 1 *grain*).—Conium is regarded more serviceable when united with Ipecac. *Dose*—3 to 5.

Cook's Pill (3 *grains*).—*Aloes*, 1 *grain*; *Calomel*, ½ *grain*; *Rhei*, 1 *grain*; *Soap*, ½ *grain*. Laxative and alterative. A very popular pill on the plantations through the South. *Dose*—1 to 3.

Copaiba, Pure Solidified (4 *grains*).—In small doses it improves the digestion, and in large doses it occasions nausea and alvine dejections. It has an especial action on the mucous membranes, and particularly on the genito-urinal membranes. *Dose*—2 to 5.

Copaiba Compound.—*Pil Copaib., Resin Guaiac, Ferri Citrate, Oleo-resin: Cubeb.*—Unites a gentle but efficient chalybeate with powerful diuretics. Employed in gleet, gonorrhea, and that class of diseases. *Dose*—1 to 3.

Copaiba and Cubebs Ext. (3 *grains*).—*Pil. Copaiba*, 2 *grains*; *Oleo-resin: Cubeb*, 1 *grain*. Produces effects similar with Copaiba pure, and given in the same type of disorders. *Dose*—2 to 4.

Copaiba, Ext. Cubebs, and Citrate of Iron (3 *grains*).—This pill has properties analogous to Copaiba Compound. *Dose*—1 to 4.

Cornin (2 *grains*).—It may be used in all cases where Quinine is indicated, and is frequently preferred to the Alkaloidal Salt. See Cornus Florida. *Dose*—1 to 5.

Cornus Florida Ext. (2 *grains*).—Tonic, astringent, and highly stimulant. These pills are used with advantage in typhoid and periodical fevers, in all cases where tonics are advised. *Dose*—2 to 5.

Corrosive Sublimate (1-8 *and* 1-16 *grain*).—Alterative. Its remedial employment has a wide range of application. Efficient instrument to combat syhilitic maladies, nervous disorders, diseases of the bones, &c. *Dose*—(1-16 grain) 1 to 2.

Cubebs Ext. (2 *grains*).—Exercises a decided influence over the urinary apparatus. It has been successfully administered in chronic bronchitis, laryngitis and dyspepsia. *Dose*—1 to 6.

Cubebs and Alum (3 *grains*).—Alum is stated greatly to increase the efficacy of Cubebs. (Waring.) *Dose*—2 to 4.

Cubebs Ext. Rhatany and Iron (3 *grs*).—*Ext. Cubebs*, 1½ *grains*; *Ext. Rhatany*, ½ *grain*; *Iron Sulphate*, 1 *grain*. Astringent, stimulant and tonic. This combination appears to be indicated in mucous discharges, incontinence of urine, chronic diarrhea, and other fluxes. *Dose*—1 to 3.

Cypripedium Ext. (2 *grains*).—Useful in hysteria, chorea, nervous headache, and all cases of nervous irritability. *Dose*—2 to 4.

Digitalin (1-60 *grain*).—Digitalin produces effects on the system analogous to Digitalis. The potency of this concentrated principle necessitates care and prudence in the administration. Its sedative influence is directed particularly to the generative organs. *Dose*—1 to 2.

Digitalis Ext. (½ *grain*).—Sedative and diuretic. The former adapts it to cases in which the action of the heart requires to be controlled, the latter renders it invaluable in dropsical affections. *Dose*—1 to 3.

Dinner Pill (Lady Webster's, 3 *grains*).—*Aloes, Soct., Gum Mastich, Rose Leaves*. A favorite pill in indigestion, dyspepsia and constipation. *Dose*—1 to 3.

Elaterium, Clutterbuck's (½ *grain*).—Elaterium is a drastic purgative. Applicable in cases requiring very copious evacuations, as in the treatment of passive dropsies, especially in ascites and hydrothorax, as a revulsive in cerebral affections, &c.

Gamboge Compound (U. S. P., 3 *grains*).—*Gamboge, Aloes, Soct., Ginger, Jamaica, Soap*. An active, but mild and reliable cathartic. *Dose*—3 to 5.

Gentian Ext. (2 *grains*).—Promotes the appetite, invigorates digestion, and acts as a general corroborant. *Dose*—2 to 6.

Gentian Compound (U. S. P., 4 *grains*).—*Ext. Gentian, Rhei, Pow'd, Oil Car.*—A laxative to the constipation of sedentary and dyspeptic persons. *Dose*—1 to 5.

Geraniin (1 *grain*).—Employed for all purposes to which astringent pilular medicines are applicable. *Dose*—1 to 5.

Hellebore, Black, Ext. (1 *grain*)—Alterative and emmenagogue. Large doses are drastic cathartic. Dr. Mead considered it superior to all other emmenagogue medicines. *Dose*—1 to 5.

Hooper's Female Pills (2½ *grains*).—*Aloes, Soct., Iron Sulphate, Extract Black Hellebore, Myrrh, Soap, Canella, and Ginger, Jamaica*.—Extensively used for their emmenagogue properties. *Dose*—1 to 3.

Hydrastin, Resinoid (1 *grain*).—The resinoid principle of Hydrastis Canadensis. *Dose*—2 to 6.

Hydrastin, Alkaloid (1 *grain*).—The alkaloid principle of Hydrastis Canadensis. *Dose*—1 to 5.

Hyoscyamus Ext. (¼, ½ *and* 1 *grain*).—Calms and soothes any irritation of the system, allays pain, and relieves spasms. *Dose*—(½ grain) 2 to 4.

Ignatia Ext. (½ *and* 1 *grain*).—Very similar to Nux Vomica, but more energetic. Useful in nervous debility, amenorrhea, chlorosis and epilepsy. *Dose*—(½ grain) 1 to 3.

Iodine (½ *grain*).—Principally employed in diseases of the absorbent and glandular system. *Dose*—1 to 4.

Iodoform and Iron (2 *grains*).—*Iron, by Hydrogen*, 1 *grain*; *Iodoform* 1 *grain*. This combination is serviceable to arrest the progress of phthisis, as an alterative in the treatment of cutaneous diseases, strumous enlargements of the glands, &c. *Dose*—1 to 3.

Ipecac Ext. (½ *grain*).—Ipecac, in small doses, acts as a tonic, and is useful in some forms of dyspepsia. *Dose*—1 to 3.

Ipecac and Opium (2 *grains*); *Opium*, ½ *grain*; *Ipecac*, ½ *grain*; *Potass. Sulphate*, 1 *grain*. =5 *grains Dover's Powders*. An admirable anodyne diaphoretic, not surpassed perhaps by any other combination in the power of promoting perspiration. *Dose*—2 to 6.

Ipecac and Opium (10 *grains Dover's Powders*).

Ipecac and Squills (U. S. P., 3 *grains*).—A mild expectorant medicine for children when threatened with an attack of croup, and beneficial in catarrh, bronchia, and that class of complaints when a gentle expectorant stimulant is required. *Dose*—1 to 3.

Iridin (½ *and* 1 *grain*).—The oleo-resinous principle of Blue Flag. Cathartic, alterative, sialagogue, diuretic and anthelmintic. *Dose*—(½ grain) 1 to 6; (1 grain) 2 to 5.

Iron and Aoles (4 *grains*).—See Aloes and Iron.

Iron Citrate (2 *grains*).—Highly esteemed ferruginеous preparation. Suitable for children in ordinary cases of debility. *Dose*—2 to 3.

Iron Citrate and Quinine Cit. (1 *and* 2 *grains*).—Tonic. A convenient form for administering Quinine and Iron in combination. *Dose*—(1 grain) 2 to 6.

Iron Citrate and Strychnia Cit. (2 *grs.*) —*Strychnia*, 1-50 *part; Iron*, 1 *part*. Chalybeate tonic, and nervine stimulant. Has been used successfully in atonic dyspepsia, some forms of paralysis, chorea and amenorrhea. *Dose*—1 to 2.

Iron Compound (U. S. P., 3 *grains*).—*Myrrh, Soda Carbonate, Iron Sulphate*. This pill is used principally as an emmenagogue and antihectic tonic. *Dose*—2 to 6.

Iron, Carbonate of (Vallet's Formula, 3 *grains*)—Particularly useful in chlorosis, amenorrhea, and other female complaints. Vallet's preparation is the best to produce the alterative effects of Iron. *Dose*—3 to 10.

Iron, Carbonate of, and Manganese (3 *grains*).—Tonic and alterative. It is asserted that cases of anaemia, which had resisted the administration of Iron alone, yielded rapidly to the combination of this metal with Manganese. *Dose*—1 to 3.

Iron Hydrocyanate (½ *grain*).—Valuable in epilepsy. *Dose*—1 to 2.

Iron and Iodoform (2 *grains*).—See Iodoform and Iron.

Iron, Lactate (1 *grain*).—Possesses the general medical properties of the ferruginеous preparations. Has a marked effect in increasing the appetite. Efficacious in chlorosis, with or without ammenorrhea. *Dose*—1 to 2.

Iron, Phosphate (2 *grains*).—Advised in cancerous affections. Potent to invigorate and restore the virile powers. *Dose*—2 to 4.

Iron, Pyro Phosphate (1 *grain*).—Blood-restorative, tonic and alterative. The Pyro Phosphate corresponds with the preceding salt. *Dose*—2 to 5.

Iron, Proto Iodide of (1 *grain*).—Tonic, alterative, diuretic, and emmenagogue. Sharpens the appetite, promotes digestion, and occasionally proves laxative. Chiefly employed in scrofulous affections, swellings of the cervical glands, visceral obstructions attended with deficient action, chlorosis, atonic amenorrhea, and leucorrhea. *Dose*—2 to 4.

Iron, Quevennes, by Hydrogen (1 *and* 2 *grains*).—Employed in anæmia, chlorosis, amenorrhea, chorea, and enlargement of the spleen following intermittent fever. Its general mode of action is to improve the quality of impoverished blood. *Dose*—3 to 6.

Iron and Strychnia (2 1-60 *grains*).—*Strychnia*, 1-60 *grain; Iron, by Hydrogen*, 2 *grains*. "Beneficial in dyspepsia when there is want of appetite, constipation, and a sensation of weight in the epigastrium after eating." Strychnia appears to overcome constipation by its peristaltic action on the portal circle. *Dose*—1 to 2.

Iron, Sulphate Exsic (4 *grains*).—As an astringent in diseases attended with immoderate discharges, such as passive hemorrhages, diabetes, leucorrhea, gleet; as a tonic in dyspepsia, and in the debility following protracted diseases. *Dose*—1 to 5.

Iron, Valerianate (1 *grain*).—Tonic and antispasmodic. Given in hysterical affections complicated with chlorosis. *Dose*—1 to 2.

Jalap (1 *grain*).—In small doses aperient and laxative, in large doses an active, but safe and convenient purgative. Its hydragogue powers eminently adapt it to the treatment of dropsies. *Dose*—1 to 6.

Jalapin (1 *grain*).—Purges violently. Is regarded the basic substance of Jalap. *Dose*—1 to 2.

Kermes (½ *grain*).—Recommended as an invaluable medicine in childbed fevers, to promote diaphoresis, and to reduce the force of the circulation. *Dose*—2 to 4.

Krameria Ext. (*Rhatany*, 2 *grains*).—One of the most active vegetable astringents. Much used in diarrheas, dysentery, and passive hemorrhages. *Dose*—1 to 5.

Lactuca Ext. (*Lettuce*, 1 *grain*).—Quiets nervous irritation and allays cough. *Dose*—1 to 3.

Leptandrin (1 *grain*).—Leptandrin gently excites the liver and promotes biliary secretion without producing the least irritation of the bowels. It is only slightly laxative, while it acts as a tonic on the stomach. *Dose*—1 to 2.

Leptandrin Compound (1½ *grains*).—*Leptandrin*, 1 *grn; Irisin*, ½ *grn.; Podophyllin*, ¼ *grn.* Has been exhibited with good effects in liver affections, in chronic visceral obstructions, rheumatism, &c. *Dose*—1 to 4.

Lupulin (3 *grains*).—Possesses no inconsiderable power to control delirium tremens and watchfulness, in connection with nervous irritation, anxiety or exhaustion. *Dose*—2 to 3.

Magnesia Calcined (2 *grains*).—Antacid and laxative; much used in dyspepsia, sick-headache, gout, and other complaints attended with sour stomach and constipation. *Dose*—2 to 5.

Magnesia and Rhei (2 *grains*).—*Magnesia*, 1 *grain; Rhei*, 1 *grain*. An excellent combination in constipation and dyspepsia. *Dose*—1 to 2.

Mercury, Prot. Iodide (½ *grain*).—A superior remedy in scrofulous syphilis. Dr. Schedel remarks: "Of its goods effects too much can not be said." *Dose*—1 to 2.

Mercury, Red Iodide (1-16 *grain*).—Alterative, stimulant and deobstruent. Dr. Fuller attests its utility in syphilitic rheumatism. *Dose*—1 to 4.

Mercury Iodide and Opii (1½ *grain*).—*Iodide*, 1 *grain; Opii*, ½ *grain*. The advantage of conjoining opiates with Mercury is to counteract the tendency of the mercurials to irritate the mucous membranes of the stomach and bowels in irritable subjects. *Dose*—1 to 3.

Morphia, Acetate (¼ *grain*).—Anodyne and soporific. Effecting the system similarly with the other Salts of Morphia. Some practitioners give it the preference. *Dose*—1 to 2.

Morphia Sulphate (1-32 *and* ¼ *grain*).—Applicable to all cases when the object is to relieve pain, quiet restlessness, promote sleep, or to allay nervous irritation. *Dose*—(1-32 grain) 2 to 4.

Morphia Valerianate (¼ *grain*).—This Salt is used to some extent in nervous diseases, restlessness in fevers, &c. *Dose*—1 to 3.

Morphia Compound (¾ *grain*).—*Morphia Sulphate*, ¼ *grain; Tar. Pot. and Ant.*, ¼ *grain; Calomel*, ¼ *grain*. Employed in febrile diseases, especially of the thoracic organs. *Dose*—2 to 4.

Nitrate Silver (¼ *grain*).—Tonic and antispasmodic. Employed in epilepsy, chorea, angina pectoris, and other spasmodic affections. *Dose*—1 to 2.

Nux Vomica, Ext. (*¼ and ½ grain*).—Increases the action of the various excretory organs. Is principally exhibited where there is want of nervous energy. *Dose*—1 to 2.

Opium (*1 grain*).—Opium acts under different circumstances as a diaphoretic, febrifuge, and antispasmodic. *Dose*—1 to 4.

Opium and Acetate of Lead (*2 grains*).—*Opium, 1 grain; Acetate, 1 grain.* Advantageous in hemorrhages, attended with great constitutional excitement. *Dose*—1 to 3.

Opium and Camphor (*3 grains*).—*Opium, 1 grain; Camphor, 2 grains.* Effective preparation to allay pain and promote rest [See Camphor and Opium]. *Dose*—1 to 2

Opium, Camphor and Tannin (*3½ grs.*)—*Opium, ½ grain; Camphor, 1 grain; Tannin, 2 grains.* Astringent united with soothing and sedative influences. *Dose*—1 to 2.

Phytolaccin (*½ grain*).—Highly extolled as an alterative in syphilitic, strumous, and cutaneous diseases. Phytolaccin is the basic principle of Phytolacca Decandra. *Dose*—1 to 2.

Podophyllum Ext. (*Mandrake, 1 grain*).—Hydragogue and deobstruent. Valuable in many chronic complaints. In bilious and typhoid febrile diseases, it is a valuable cathartic or emetico cathartic, often breaking up the disease at once. *Dose*—3 to 8.

Podophyllin (*½ and 1 grain*).—Purgative. Remarkably small quantities will violently affect some persons. If the stomach be acid, alkalies should previously be administered, in order to obtain a prompt and active impression. Acid appears to destroy its energy of action. *Dose*—(½ grain) 1 to 2.

Podophyllin and Blue Pill (*3 grains*).—*Podophyllin, ½ grain; Blue Pill, 2½ grains.* An excellent alterative and cholagogue combination. *Dose*—1 to 2.

Poppy Ext. (*2 grains*).—Possesses properties analogous to Opium, though in an inferior degree. *Dose*—2 to 4.

Potassa, Tartrate of, and Iron (*2 grs.*).—Combines the cooling purgative qualities of the Tartrate with the tonic properties of the Iron. *Dose*—2 to 4.

Potass. Iodide (*2 grains*).—Useful in scrofulous affections, and is one of the best alterative remedies in mercurio syphilitic sore throat. *Dose*—1 to 5.

Potass. Bromide (*1 grain*).—Cases of enlarged spleen and liver, hypertrophy of the heart, and glandular swellings have been successfully treated by this agent. *Dose*—3 to 6.

Quinine, Sulphate of (*½, 1, 2 and 3 grains*).—Produces upon the system, as far as can be judged from observation, the same effects as Peruvian Bark, without being so apt to nauseate and oppress the stomach. *Dose*—1 to 6.

Quinine Compound (*2 1-32 grains*).—*Quinine Sulphate, 1 grain; Iron, by Hydrogen, 1 grain; Arsenious Acid, 1-32 grain.* A useful preparation in all diseases attended with symptoms of periodicity. *Dose*—1 to 3.

Quinine, Sulphate and Ext. Belladonna (*1¼ grain*).—*Quinine, 1 grain; Belladonna Extract, ¼ grain.* These pills appear to be indicated in cases of great prostration, generally where it is desired to obtain the combined influence of an anodyne or calmative and tonic. *Dose*—1 to 4.

Quinine and Iron (*2 grains*).—*Quinine, 1 grain; Iron, by Hydrogen, 1 grain.*—Tonic and Chalybeate. *Dose*—1 to 4.

Quinine, Iron and Strychnia (*3 1-60 grains*).—*Quinine, 1 grain; Iron Carbonate, Vallet's 2 grains; Strychnia Sulphate, 1-60 grain.* Blood restorative, tonic and nervine stimulant. The continued use of this pill produces salutary effects in dyspepsia, in some types of paralysis and amenorrhea. *Dose*—1 to 2.

Quinine, Valerianate (*½ grain*).—In cases of debility attended with nervous disorder. *Dose*—1 to 3.

Quassia, Ext. (*1 grain*).—Stomachic. tonic and febrifuge. Quassia possesses several advantages over most other vegetable tonics, in that it neither produces constipation, increase of animal, or arterial excitement. *Dose*—3 to 5.

Rhei Ext. (*1 grain*).—In small quantities Rhubarb invigorates the process of digestion. It claims the preference to all other medicines in cases where the bowels are relaxed, and at the same time a gentle cathartic is required. *Dose*—2 to 6.

Rhei (U. S. P., *4 grains*).—*Rhei, 3 grains; Soap, 1 grain.* Recommended in habitual constipation. Soap counteracts the astringent effects of Rhubarb. *Dose*—1 to 2.

Rhei Compound (U. S. P., *4½ grains*).—*Rhei Ext., 2 grains; Aloes Ext., 1½ grains; Myrrh Ext., 1 grain; Oil Peppermint.* Useful in costiveness with debility of the stomach. *Dose*—2 to 5.

Rhei and Blue Pill (*4 grains*).—*Rhei Ext., Blue Pill, Soda Carbonate.*—Alterative, cholagogue, and slightly laxative. *Dose*—1 to 2.

Rhei and Iron (*3 grains*).—Combines the properties of a superior tonic and laxative; and is well adapted to those conditions in which there is loss of appetite and strength complicated with constipation, or even a relaxed state of the bowels requiring a gentle cathartic. *Dose*—2 to 3.

Rheumatic (*3 1-6 grains*).—*Ext. Colocynth Compound, 1½ grain; Ext. Colchici Acet., 1 grain; Ext. Hyoscyamus, ½ grain; Calomel, ⅙ grain.* An admirable compound pill for all rheumatic affections. If given in the early stages, will often check the progress of the disease. *Dose*—1 to 2.

Sanguinaria Ext. (*Bloodroot, ½ grain*).—Small doses stimulate the digestive organs, increase the action of the heart and arteries, while large doses produce a sedative influence on the heart. Useful in torpid conditions of the liver, pneumonia, &c. *Dose*—1 to 5.

Santonin (*½ grain*).—The exclusive anthelmintic principle of A. Santonica. *Dose*—2 to 4.

Sanguinarin (*½ and 1 grain*).—Properties are the same as Bloodroot. *Dose*—(½ grain) 1 to 4; (1 grain) 1 to 5.

Sarsaparilla Ext. (*3 grains*).—One of the most highly useful alteratives in the Materia Medica. *Dose*—2 to 5.

Savin Ext. (*1 grain*).—Emmenagogue. Savin operates actively on the uterine system. *Dose*—1 to 5.

Senna, Alx., Ext. (*2 grains*).—Reliable and convenient purgative. *Dose*—2 to 4.

Soap and Opium (U. S. P., *3 grains*).—A convenient form for administering Opium in small quantities. *Dose*—1 to 3.

Soda, Bi-Carbonate of (*4 grains*).—Resorted to in calculous cases, characterized by excess of uric acid. Given in infantile croup, with a view to the expulsion of the false membrane. *Dose*—2 to 5.

Squill Compound (U. S. P., 3 *grains*).—Applicable to the treatment of all chronic affections of the bronchial mucous membranes. *Dose*—2 to 3.

Stillingin (1 *grain*).—Exerts an influence over the secretory functions unsurpassed by any other known alterative. *Dose*—2 to 5.

Strychnia (1-48, 1-32 *and* 1-16 *grain*).—Its effects upon the system are identical with those of Nux Vomica, and it is employed for the same purposes, as a medicine. *Dose*—1 to 2.

Stramonium (½ *and* 1 *grain*).—Proves useful in those cases where Opium is indicated, but cannot be given. *Dose*—(½ grain) 1 to 2.

Tartar Emetic (½ *grain*).—Employed as an emetic at the commencement of fevers, especially those of an intermittent and bilious character; in jaundice, whooping cough and croup; and in several diseases of the nervous system, such as mania, amaurosis, tic-doloureux, &c. *Dose*—1 to 2.

Traxacum Ext. (3 *grains*).—Efficient remedy to remove torpor and engorgement of the liver. *Dose*—3 to 6.

Tannin (1 *grain*).—Beneficial in diarrhea, in colliquative sweats, in cases of chronic catarrh, with excessive and debilitating expectoration, in the advanced stages of whooping cough, and in cystirrhea. *Dose*—2 to 4.

Triplex (3 *grains*).—Aloes. Ext., 2 parts; Podophyllin and Blue Pill, each 1 part. Cathartic. Its local action on the liver in correcting the torpid states of this organ, known as bilious, constitutes its dominant value. *Dose*—1 to 2.

Uva Ursi (2 grains).—Exerts a direct influence on the kidneys and urinary passages. Serviceable in chronic gonorrhœa, strangury, fluor-albus, and excessive mucous discharges with the urine. Its astringent property makes it applicable in chronic diarrhœa and dysentery, menorrhagia, diabetes, &c. *Dose*—1 to 7.

Valerian (2 grains).—These pills are beneficial in epilepsy, mania, melancholia, delirium, and in low forms of fever where a nervous stimulant is required. Highly lauded in hysteria, and hysterical headache, palpitations and neuraliga. *Dose*—2 to 8.

Valerianate of Ammonia (1 *grain*).—This pill is much used in nervous irritability, epilepsy, chorea, headache and neuralgia. *Dose*—2 to 6.

Valerianate of Iron (1 *grain*).—See Iron Valerianate.

Valerianate of Morphia (½ *grain*).—See Morphia Valerianate.

Valerianate of Quinia (½ *grain*).—See Quinia Valerianate.

Valerianate of Zinc (1 *grain*).—An important and potent pill in neuralgic affections, and nervous derangements generally. *Dose*—1.

Veratria (1-32 *grain*).—Has been employed chiefly in gout, rheumatism and neuralgia; also, in various nervous affections, as paralysis, whooping cough, epilepsy, hysteria, and disorders dependent upon spinal irritation. *Dose*—1 to 3.

Veratrum Viride (½ *and* ½ *grain*).—Dr. Turnbull has found it useful in diseases of the heart, particularly those of a functional character. Professor Tully regards Veratria eminently efficacious in the management of gout, rheumatism; much superior to colchicum. *Dose*—(½ grain) 1 to 2.

☞ For a more extended notice, see Supplement to the Journal of Materia Medica.


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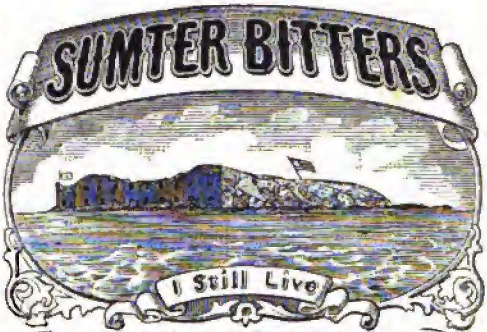

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